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MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

March 1992

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MARCH 1992 VOLUME 120, NUMBER 3

MODEL AIRPLANE NEWS

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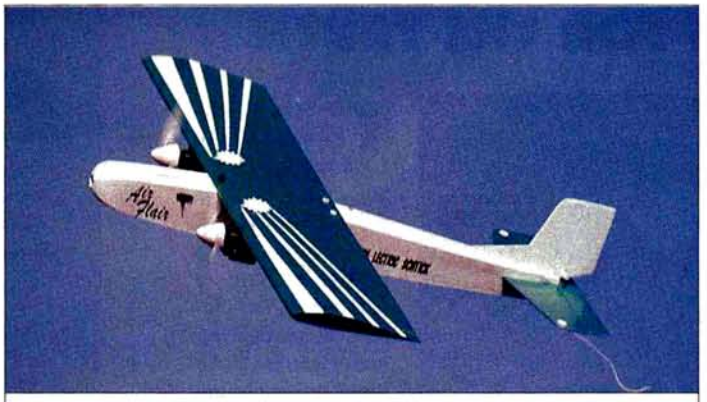

ON THE COVER: *the Great Planes P-40 Warhawk is captured in flight. (Photo by Tom Atwood.). Upper right: Ray St. Onge's Schluter Scout at the Schluter Cup. Bottom right: Richard Nixon and Nikita Khrushchev debate the merits of U.S. and Soviet ways of life. R/C played a hidden role—see "How the East Was Won."*

FEATURES

HELICOPTER SECTION

CONSTRUCTION

COLUMNS

DEPARTMENTS

Model Airplane News (ISSN 0026-7295) is published monthly by **Air Age, Inc.**,251 Danbury Rd., Wilton, CT 06897. Second-class postage paid at Wilton, CT, and at additional mailing offices. Subscription rates are: $24.95 for 1 year (foreign, $34.95); $45.95 for 2 years (foreign $65.95). **Postmaster:** send Form 3597 to **Model Airplane News,** P.O. Box 428, Mount Morris, IL 61054.

EDITORIAL

TOM ATWOOD

DIGGING FOR THE TRUTH

Editor-in-Chief Tom Atwood, left, assists Senior Editor Chris Chianelli during engine break-in before Chris evaluates the flight performance of the Great Planes P-40E Warhawk.

The photo looks like weekend fun at the flying field but, in fact, we're in the middle of a product review, which isn't an exercise we take lightly. Our purpose in product reviews is to truthfully report as much useful information as possible. Not long ago, we asked ourselves how we could do a better job at this, and the result was the expanded specifications box and flight-performance evaluations now included in our "Field & Bench" reviews. But there's more to this than just asking the right questions and reporting findings honestly and accurately. It's also our responsibility to cultivate the best reviewers (if any readers want to comment on the work of any of our reviewers, pro or con, please drop me a line).

Some of the best modelers, who potentially would make topnotch product reviewers, wind up serving as manufacturer's reps. A rep can never review a competitor's product. Can a rep review his own? As a rule, we avoid such reviews because of the conflict of interest. There's a rare exception, when getting the best presentation of a newsworthy item to the reader the fastest—again, the principle of serving the reader—justifies printing a review by an interested party. This requires that we publish an explicit reference at the top of the article that the author is a rep. Have the other modeling magazines you rely on for product information adopted a similar policy?

BYRON EXPO TO MOVE

We were surprised to learn that Byron Originals won't be holding an Aviation Expo at Ida Grove, IA, in 1992. A letter from Marc Jensen notes that the Expo must be relocated to another geographic location that can better support its continued growth, and which will be more accessible to the tens of thousands of people who would like to see the show. A new sponsor will ultimately acquire rights to the show. We hope they do as terrific a job as Byron Godbersen and his able staff at Byron Originals have done for so many years.

AEROBATICS

Dave Patrick, accomplished pattern competitor and VP of research and development at Carl Goldberg Models, has joined us with a new column called "Aerobatics Made Easy." Dave, a member of the Canadian national pattern team, helped the Canadians take 1st place in the 1991 FAI World Championships held in Australia. His accomplishments on the competition circuit are too many to list in this space! Look to his column in this and future issues for practical tips on flying and aerobatics. ■

MODEL AIRPLANE NEWS
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SUBSCRIPTION PRICES: U.S. & Possessions (including APO & FPO): 1 year (12 issues), $24.95; 2 years (24 issues), $45.95. Outside U.S.: 1 year, $34.95; 2 years, $65.95. Payment must be in U.S. funds.

SUBSCRIPTION INQUIRIES: call 1-800-827-0323.

MODEL AIRPLANE NEWS (ISSN No. 0026-7295) is published monthly by Air Age, Inc., 251 Danbury Rd., Wilton, CT 06897. Connecticut. Editorial and Business Offices, 251 Danbury Rd., Wilton, CT 06897. Phone: 203-834-2900. FAX: 203-762-9803. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Yvonne M. Micik, Treasurer. Second Class Postage Permit paid at Wilton, Connecticut, and additional Mailing Offices.

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AIRWAVES

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," **Model Airplane News,** 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

MIRACLE MINIMAX

Looking at the performance specs on the 1/4-scale Minimax featured in your December '91 issue, I came up with a great idea for publicizing our hobby. It will take two people, some string, and the Miracle Minimax (advertised stall speed, 3mph; cruise speed, 10mph).

We take the plane to the local mall and tie the end of a string to it. One demonstrator throws the other end of the string over his shoulder and walks off at 4mph, pulling the plane. The other demonstrator follows, carrying a transmitter, with which he flies the plane. No need to even start the engine! That should turn some heads.

Of course there's the possibility that someone got the performance numbers wrong. My own rough calculations suggest that the Minimax should stall somewhere in the 18 to 20mph range. If that's right, our demonstrators will have to walk over a mile during a 3-minute demonstration. But not to worry, we R/Cers can do anything.

JOHN CARROLL
Arlington, VA

John, the only time I've seen an R/Cer move that fast is when a glitch has broken contact with his airborne model and he's running cross-country, hoping to get close enough to the ship to overcome radio interference. Without an airplane in peril, I'm not sure any R/Cer will make the effort to move that quickly, although I agree that R/Cers can do anything. But that doesn't mean we don't make mistakes, and you've correctly identified an error on the Minimax spec chart.

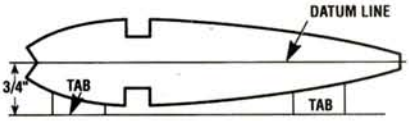
You can make a quick estimate of the plane's stall speed using a chart that was published in Part 1 of Andy Lennon's recent two-part series on flap design (see page 97 of our October 1991 issue). Andy's chart provides curves for quick estimation of stall and cruise speeds.

The wing loading of the Minimax is 17.3 ounces per square foot. The first step is to locate the point along the bottom of the chart that corresponds to this wing loading. To get a reference point, move up the diagram to the curve that corresponds to a lift coefficient of 1.2 (a typical maximum lift coefficient for a thick, flat-bottom airfoil, such as that used in the Minimax). Look to the left of your reference point and you'll see that the estimated mph (on the side of the chart) is approximately 18 to 19mph, corroborating your estimate. You can estimate a cruise speed of 37mph by assuming a lift coefficient of approximately .3. Sorry for the error. Thanks for setting the record straight. TA

GNAT TABS

Here are some answers to questions that have come up regarding my Gnat design (published as a pullout plan in the January 1992 issue of *Model Airplane News*). Although the article mentions building tabs on the ribs, the plan doesn't show the tabs except as an example on one sample rib template. Readers have asked how to add the tabs and accommodate the 1.5 degrees of washout noted in the article.

As it happens, only the prototype had this washout; subsequent models have had none. There was no noticeable detriment



to flight performance. Rounding off the outboard portions of the leading edge (LE) and keeping the root area of the LE relatively sharper also work well to keep the tips flying longer than the center section. But if you have a wing jig, go ahead and build it with the washout, if that's your preference!

If you don't have a jig and would like to

build on the tabs, here's a painless way to generate them. First, trace the outline of each rib onto a temporary rib template (vellum, carbon paper, or tracing paper all work well). Next, draw a horizontal line 3/4 inch above the bottom of your final template material. On each temporary rib, draw a datum line from the focal point of the LE notch to the halfway point on the trailing edge (TE) of the rib. Place the marked rib over the final template material so that the datum line lies directly over the horizontal line that you drew earlier. The bottom of any given tab (formed by the bottom of the final template material) will be the same 3/4-inch distance from the datum line, regardless of the size of the rib.

Draw the rib pattern onto the final template material, and place the tabs in any convenient position on each rib. Allow room for the width of the lower TE sheeting, which is applied before removing the wing from the board. These tabs will give clearance from the building board of about 1/32 inch at the root and 3/16 inch at the tip of the wing. The tabs will yield a straight and true wing that flies well.

I've also been asked about the recommended control-surface deflections. These are: rudder throw—1 1/4 inch; elevator—3/8 inch; ailerons—1/4 inch. Don't anguish over washout. Complete the airplane as per the article, and you'll have an airplane that flies well!

JOHN (FLYING DUTCHMAN) VAN'T-HAAFF
Victoria, B.C., Canada

Thanks for the pointers, John. This handy building-tab technique will surely assist many scratch-builders who aren't using wing jigs yet—and not only with the Gnat. TA

SEA FURY SEARCH

Just to let you know the strange ways in which your magazine finds its buyer: I'm an Austrian who has been living in New Zealand for two years, and I buy your magazine regularly. But now to the reason why I'm writing: the article

(Continued on page 10)

IN MEMORIAM
MR. SHIGEO OGAWA
1917-1991

With deep regrets, we report the passing of Mr. Shigeo Ogawa, of O.S. Engines, on November 4, 1991. Mr. Ogawa was one of the great pioneers of model engine development and had been involved in the hobby industry since founding O.S. in 1936. He will always be remembered for his innovative spirit and his dedication to quality, which will live on in the company he created. The current management of O.S. will continue to run the company without interruption. His family, friends, associates and the entire hobby industry will miss this true industry pioneer.

GREAT PLANES MODEL DISTRIBUTORS

AIRWAVES

(Continued from page 9)

about Top Gun '91 was superb! I also enjoyed all the pictures. I fly helicopters (Concept 30, X-Cell 60 Custom), gliders (Magic, Legend, F3B Homebrew) and powered airplanes (I forgot them as I crashed them—nah, it's not that bad). I'd like to get into scale now.

We have a full-size Warbird Club here, and that's where I saw a Sea Fury. I immediately decided to build one of these, but I don't know where to get the plans. In the Top Gun article, it's mentioned that the winner Mel Whitley sells plans for his beautiful Sea Fury. Does he?

I also really like your helicopter section. It's time that people stopped being afraid of flying helicopters. If more people fly them, then more cheaper kits will come on the market and your heli section will grow as well. I hope you can help me, and thanks for publishing such a good magazine.

WOLFGANG WORGAS
Auckland, New Zealand

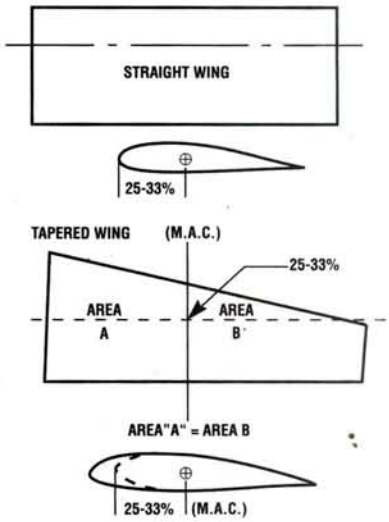
Wolfgang, the Sea Fury is, indeed, a beautiful aircraft, whether it's full size or a model. Mel Whitley did a surperb job and deserved his win in the '91 Top Gun Expert Class. To the best of our knowledge, Mel isn't selling copies of his plans, but Roy Vaillancourt of Vailly Aviation (18 Oakdale Ave., Farmingville, NY 11738; (516) 732-4715) does offer plans for a 90-inch-wingspan version of the Hawker Sea Fury. The plans cost $35, and they're suitable for 3.4 to 4.2ci engines. Roy also offers a cowl, canopy and spinner for this wooden model.

GY

BALANCING ACT

I've been reading your magazine and flying R/C for about a year now. My favorite sections are "Airwaves," "Quiet Flight," "Hints & Kinks" and, of course, "Small Steps." I've built two sailplanes so far, and I'm now interested in 1/2A planes. I plan to buy a few kits, and I'm in the process of drawing plans for a 26-inch-wingspan 1/2A plane (.020). Please tell me how to find the center of gravity (CG) for this plane. I plan to use this information in future scratch-built planes. Thanks!

BERNIE PISARCIK
Clementon, NJ



Bernie, finding the CG isn't all that hard to do, but it does depend on a few things. Is the wing a constant (straight) chord or is it tapered? What is the plane's wing area? What type of tail section (flat or lifting) does it have? For a straight-wing sport model with either a flat-bottom or a semi-symetrical airfoil, the range of the optimal CG point could be anywhere from 25- to 33-percent of the chord measured from the leading edge. If the plane is an old-timer with a relatively large, lifting tail surface, the CG could be as far back as 45 percent.

For a tapered wing, it's a little more complicated. You first have to determine the mean average chord (MAC) and then balance the model in the 25 to 33 percent range. The MAC is basically the chord location at which the areas of the wing on either side of it are the same. Some math and/or geometry is involved; it's too involved to get into here, but we'll explain it all further in an upcoming article. There are several books on model aerodynamics that can help. Try "R/C Model Airplane Design," by A.G. Lennon, 1986, Motorbooks International.

GY

R/C AEROMODELING GOES TO SCHOOL

In your January '92 issue, I noticed several letters about aeromodeling classes being taught in schools. Having been a teacher for 16 years and a model airplane builder since

(Continued on page 74)

FIFTY YEARS AGO

GERRY YARRISH

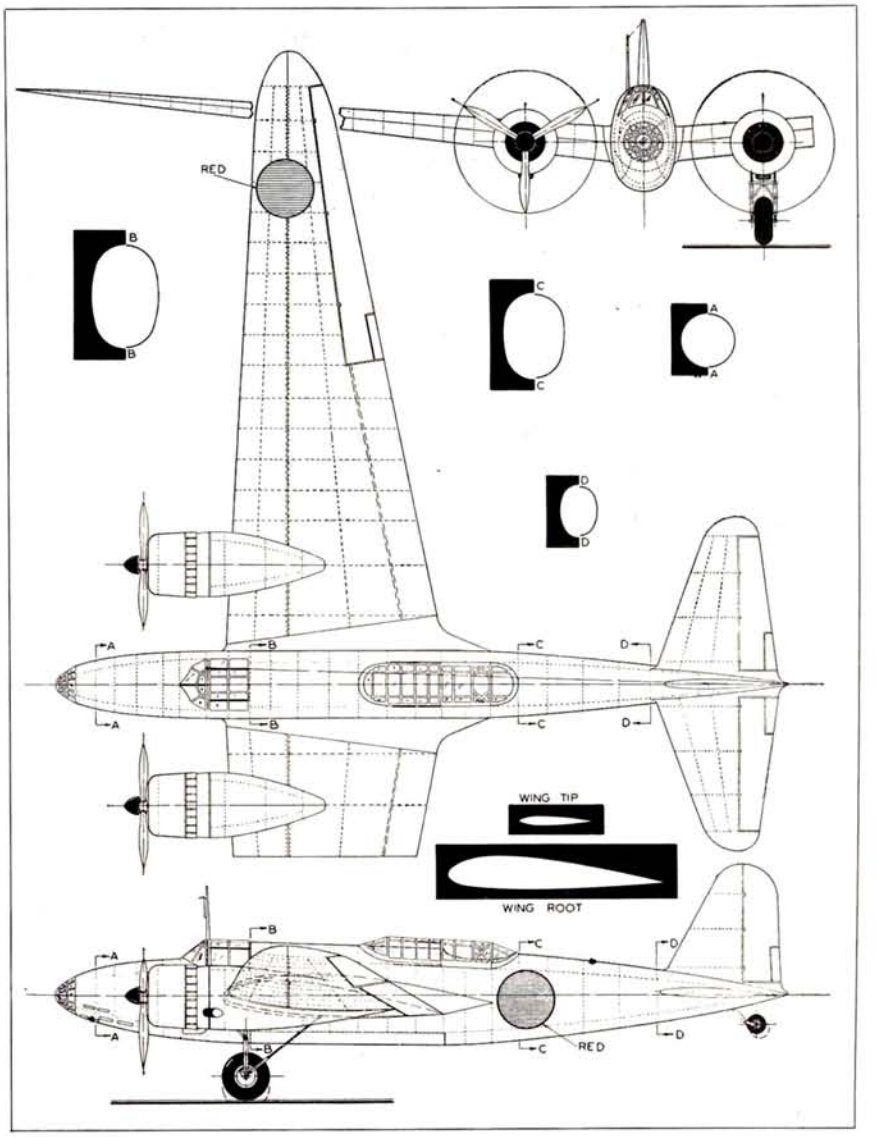
THE GANGSTERS' BIG GUN

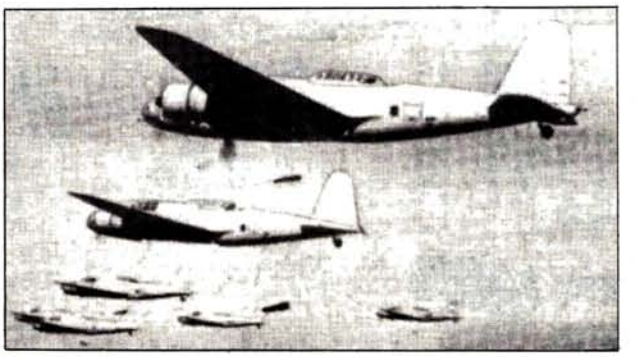
FOR MANY readers of the March '42 issue, *Model Airplane News* was a diversion of sorts from the worries and fears about WW II, yet everyone craved news and facts. In particular, aviation enthusiasts wanted to read about the Axis' air power (Germany, Italy and Japan).

Following the December attack on Pearl Harbor, the Japanese were the most "popular" enemy; in fact, a Japanese aircraft—the Nakajima Type 19 bomber was featured on that month's cover, and we called it the "Gangsters' Big Gun."

Notwithstanding the propaganda that labeled all Japanese aircraft as mere carbon copies of other nations' designs, the Nakajima Aircraft Co. had a long and active history in the development and production of many successful civilian and military aircraft.

Japan and the U.S. had a good trading history up to, and including, December 7, 1941. Licensing, tools and patent rights for many designs were freely traded to Japan by many American, British and French companies. Aircraft engines as well as airframes were licensed to be built in the Far East. They included: the French Lorraine engine, which was built by Aichi; the French Hispano-





A Nakajima Type 19 bomber on a mission over the South Pacific. First manufactured in 1938 as a commercial transport, it was later converted into a bomber and used over Manila.

Suiza; the Brit's Armstrong-Siddeley; and these German engines: the Junkers (built by Mitsubishi), the BMW (built by Kawasaki) and the Jupiter, which went to Nakajima.

In 1938, the State Department had seen fit to allow the sale of the Douglas DC-4 to the Japanese, with all drawings, dies and tooling. At that time, it was impossible to predict what was to come in 1941, so no attempt was made to prevent the Japanese from using everything they had to design their own war machines.

First produced in 1938, many of the Type 19's features resembled those of the DC-4, and it was originally built as a commercial transport plane. It carried a pilot and a copilot and could accommodate five passengers. When the need arose, however, it was easily transformed into a bomber, because it already had a glass-enclosed nose turret. With the passenger seating removed and a bomb bay and rear gunner's cockpit installed, it first saw duty in the Pacific over Manila.

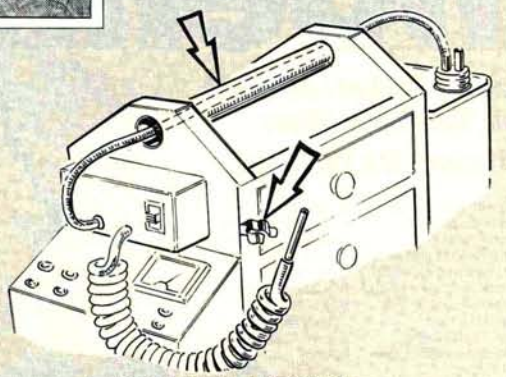
Powered by two Mitsubishi Type IV engines, each rated at 870hp, it had a top speed of 217mph and a combat cuising range of 2,484 miles. With a wingspan of 72 feet, 2 inches, it was 50 feet, 9 inches long and weighed 10,450 empty. Its gross weight was 15,860, because it carried 4,000 pounds of bombs. The size of its crew varied between four and seven and depended on the type of mission flown. Whether or not it was a "carbon copy" of a U.S. aircraft, the Nakajima Type 19 bomber was used very successfully in the Manila and Hong Kong offenses.

The three-views shown here were first published 50 years ago and are reproduced for your enjoyment. Check them out and decide for yourself whether the Nakajima was only a Douglas DC-4 clone. ■

HINTS & KINKS

JIM NEWMAN

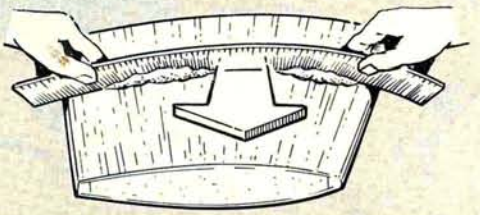
Model Airplane News will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o *Model Airplane News*, 251 Danbury Rd., Wilton, Ct 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO, AND NOTE YOU SUBMIT. Because of the number of ideas we receive,we can't acknowledge each one, nor can we return unused material.



TIDY FUEL HOSES

The dowel handle on the field box has been replaced with a copper pipe of similar length. Fuel hose runs through this pipe from one end of the box to the other to eliminate the unsightly look of draped hoses. (Note how the fuel hose can be stowed in a fuse clip on the side of the box.) It's strongly recommended that you cap all hoses and vents when they're not in use so that moisture doesn't get into the fuel and so that the nitro can't evaporate.

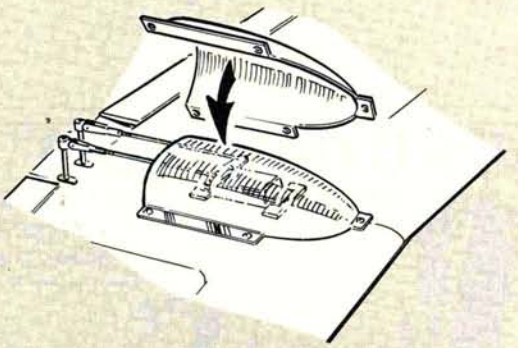
Bob O'Neil, Rochester, NY



DENT FILLING AND SPLINING

After you've applied filler, smooth it with a spline that's a flexible steel or plastic ruler. The spline will conform to the contours of the surface that you've filled, so very little sanding will be necessary.

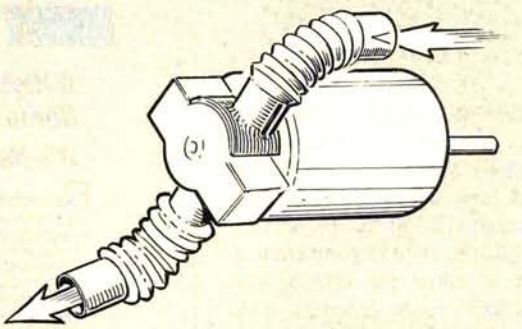
Frank Waters, Albany, NY



AILERON SERVO PROTECTOR

When a plane's wing is torn off in a crash, the servo is usually torn off, extensively damaging both the servo and the fuselage. To minimize the damage, make this servo cover. It's smoothly contoured, so it lets the servo ride smoothly over the edge of the fuselage sides.

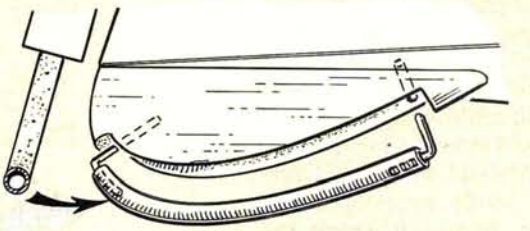
Robert Coen, Marco Island, FL



ELECTRIC MOTOR BLAST COOLING

Using large-diameter, flexible drinking straws and a little glue, you can make this simple ducting to blast cooling air over the parts of your motor that generate heat—the commutator and the brushes.

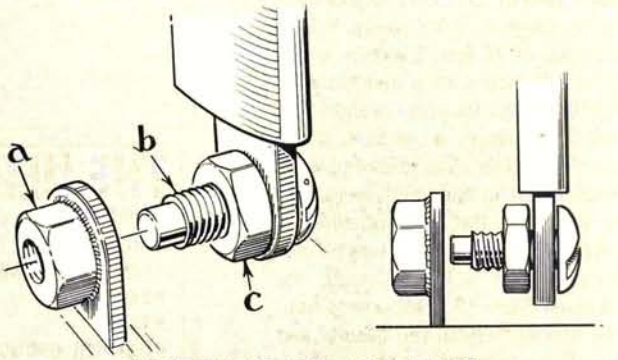
Karlo Eisele, Frankfurt Maine, Germany



DURABLE TAILSKID

If you file a groove in the bottom of a glider or an old-timer tailskid, you can fit a durable insert made out of a short piece of inner Nyrod. The plastic tubing is held in place by a combination of short pieces of wire and CA. Take care! The Nyrod is very springy, and if you let go of it, it will flip the wire clear across the shop—possibly into your eye, so why not wear your safety glasses for this job?

David Gregory, Diamond Creek, Victoria, Australia



CAPTIVE STRUT SCREWS

(a) is a nut that's soldered to a metal tab that protrudes from the wing. (b) is a machine screw that has been inserted through the wing strut and held by a thin locknut (c) that has been glued with CA to the machine screw. The locknut isn't tightened to the strut; it's left a little slack so that the machine screw is free to rotate in the strut. Notice how the threads have been removed from the end of the screw so that it finds its own center in the captive nut.

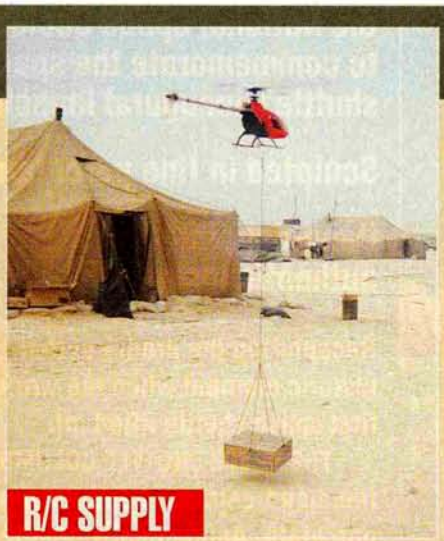
Harry Ellwood, Rochdale, Lancs., England

AIR SCOOP

CHRIS CHIANELLI

New products or people behind the scenes—my sources have been put on alert to get the scoop! In this column, you'll find news that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares?—it's you, the reader, who matters most! I spy for those who fly!

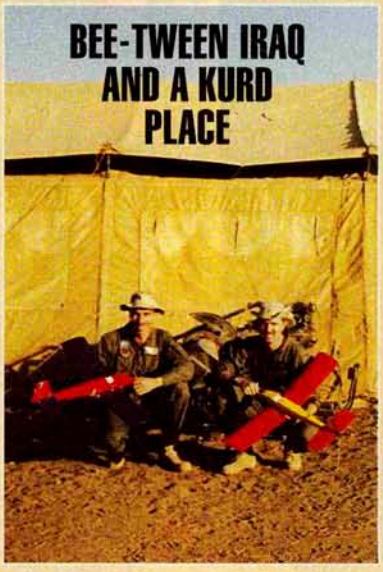
R/C DESERT UPDATE



R/C SUPPLY

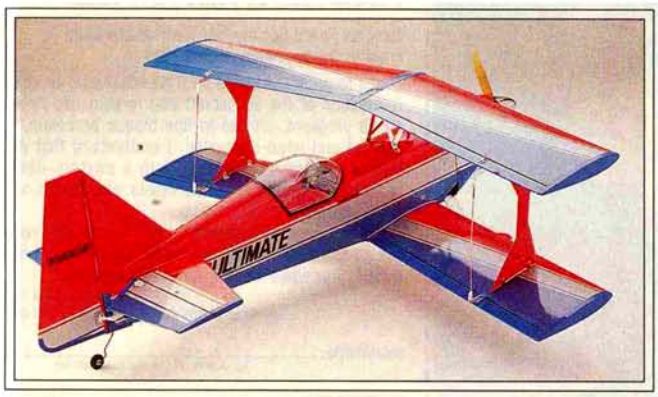
In the extreme Saudi Arabian heat, Sgt. Anthony L. Flannery kept cool in the shade. During the war, he performed his part of supply missions to the front with his O.S. .28-powered Concept 30. Rumor has it that the Sergeant made quite a lot of money renting out his Concept to supply grunts.

BEE-TWEEN IRAQ AND A KURD PLACE



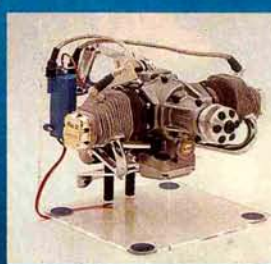
Chief Warrant Officer (class) Jeff Perkins (right) and his flying buddy Doug Beamer are pictured here with their Randy Randolph Bee-tweens built from the *Model Airplane News* pull-out plans in the July '91 issue. Doug's is powered by a Black Widow .049, and Jeff's is powered by his very first engine—a 19-year-old Golden Bee. Jeff writes, "Doug and I are CH-47 D Chinook Army helicopter pilots stationed in Northern Italy. We enjoy model flying here, and always read *Model Airplane News*...Building the Bee-tween was straightforward, right by the plans." When the guys flew to the northern Iraq/southeastern Turkey region for Operation Provide Comfort (the Kurdish relief effort), they packed their Bee-tweens along with their flight gear to "check out the Iraqi air defense network."

After the success of its Warhawk, Hobbico has decided it's full-speed ahead with the Ultimate Bipe ARF. The Ultimate will feature the same triple skin over an inner balsa and plywood structure as the Warhawk. The 6- to 7-pound model has a wingspan of 44 inches and an area of 660 square inches. To power it, you'll need a .45 to .50 2-stroke or a .60 to .91 4-stroke.



ASAP ULTIMATE BIPE

KAVAN/CONTINENTAL



The latest versions (ignition and glow) of the incredibly beautiful, 3ci, scale Continental opposed twin engine (manufactured by Kavan) is now exclusively available from Hobby Lobby International. Like the glow version, the ignition engine has a separate oil sump, the engine is lubricated by means of an oil pump, and you can check the sump level with a dip stick! The ignition version uses the Hall Effect principle in which there are two magnetic pick-ups—one for high-speed operation and the other to retard the spark for starting and low-speed operation. This setup improves all-around performance, idle, and fuel consumption, and it minimizes kick-back startup. The 4.6hp ignition version turns up 9,200rpm with a 1,400rpm idle, while the glow version turns up 8,800rpm with a 1,600rpm idle. The recommended prop size starts at 20x10.

PROJECT SEAHORSE?

On September 6, 1951, when R/C research for full-scale development was in its infancy, a 1/10-scale, 125-pound model took to the skies. The model was dynamically similar to the Convair XP5Y-1 (the world's first turboprop-powered seaplane), and it was powered by four midget engines that developed 1 1/2hp each. The XP5Y-1 was the first full-scale airplane developed from Convair's model research program; the model made over 2,000 successful flights. Forget about a neck strap for *this* transmitter.

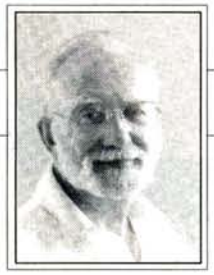
In the case of this Stinson, the "L" could stand for *large*. Vailly Aviation's true 1/4-scale plans for the 102-inch-wingspan L-5 are also available with a fiberglass cowl, formed and welded landing gear (with strut covers, blisters and dummy exhaust stacks) and a construction photo pack. The design is all conventional balsa construction with plug-in wings for easy transportation and optional flaps (shown on the plans). With an area of 1780 square inches, the Stinson is reportedly a very economical way to get into giant scale. For more information, contact Vailly Aviation, 18 Oakdale Ave., Farmingville, NY 11738; (516) 732-4715.

STINSON L-5

7-FOOT SCHNEIDER

Tom Strom's Schneider Sport 320 is now officially joining his .60 and 1.20 versions, and it's available as a kit. Like the others, this model will be available with factory-assembled, sealed ABS floats. The floats have a vee-bottom, sharp-edge chine line to control spray. The model specifications are: wingspan—84 inches; area—1305 square inches; weight (without floats)—16 pounds; weight (with floats)—20 pounds. The float specs are: length—54 inches; nose to step—27 inches; weight—24 ounces each.

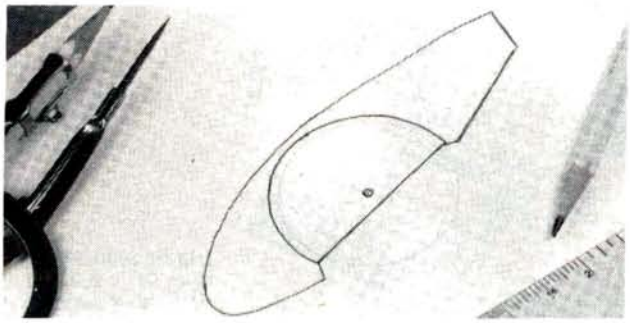
How To:



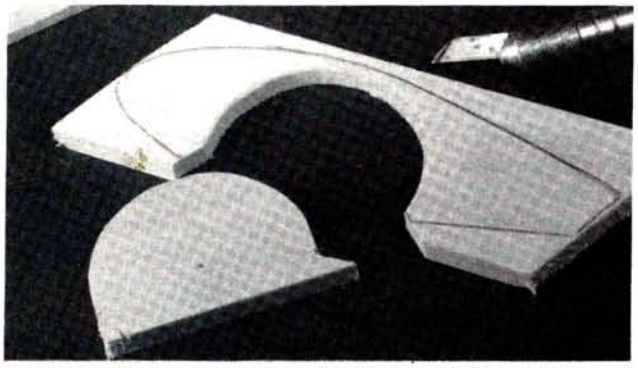
RANDY RANDOLPH

MAKE REPLACEMENT WHEEL PANTS

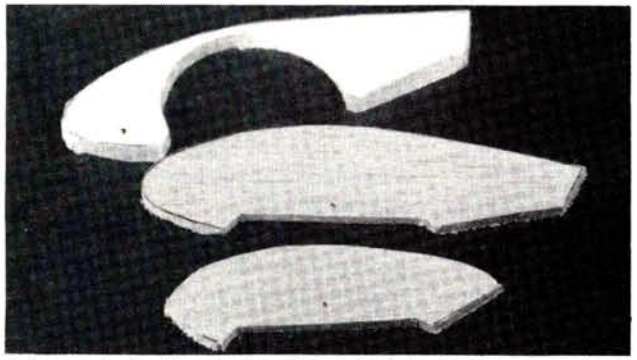
Wheel pants dress up any airplane and are provided in a number of kits. Unfortunately, flying from rough fields or "off-runway" landings can rapidly destroy wheel pants. The photos show how to make balsa and plywood pants to replace those you've lost.



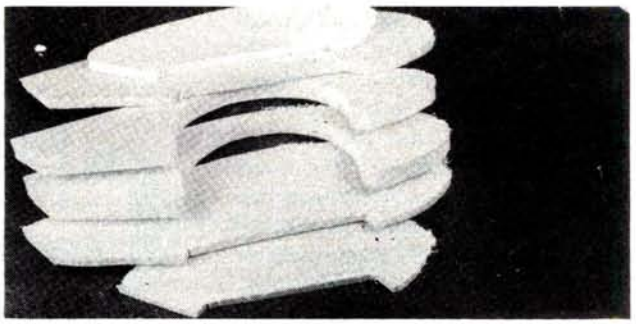
1. Make a template of the original pant by tracing its outline from the plan. If an outline isn't available, use a compass to draw the wheel's diameter and "freehand" the pant around it. As a rule, the length of the pant in front of the wheel is one-half the diameter of the wheel, and the aft length is equal to the wheel's diameter.



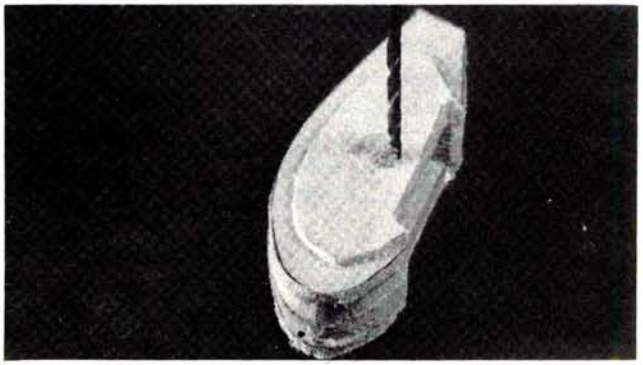
2. To make the pant's center pieces, trace its outline on 1/4-inch-thick sheet balsa. The wheel cutout should be 1/8 inch larger than the wheel's diameter. Make enough center pieces so that you can stack them and make the pants 1/4 inch wider than the wheel.



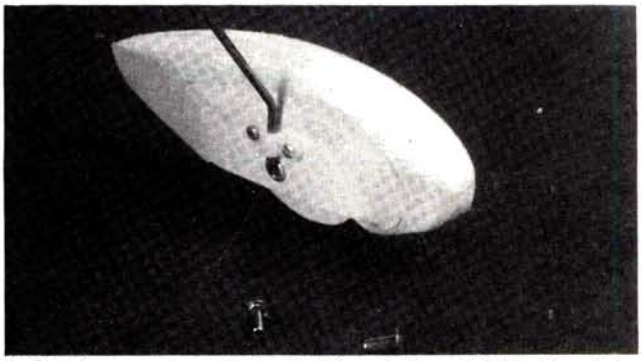
3. For each wheel, make two, 1/8-inch-thick hard-balsa center pieces without the wheel cutout. Use the template to mark the center of the cutout on these side pieces. Cut two more side pieces of reduced size; make one out of 1/8-inch-thick plywood and the other of 1/8-inch-thick balsa.



4. Stack and glue the pieces together with the center pieces in the middle, one full-size piece on each side, and one reduced size side piece on the outside. Glue the plywood side piece to the side of each pant that's next to the landing gear. Use the notches in the cutouts to align them.



5. Drill a hole for the axle at the location you marked in step 3. A drill press is great, but a hand drill works well if you match the marks carefully. Sand the stack to shape.

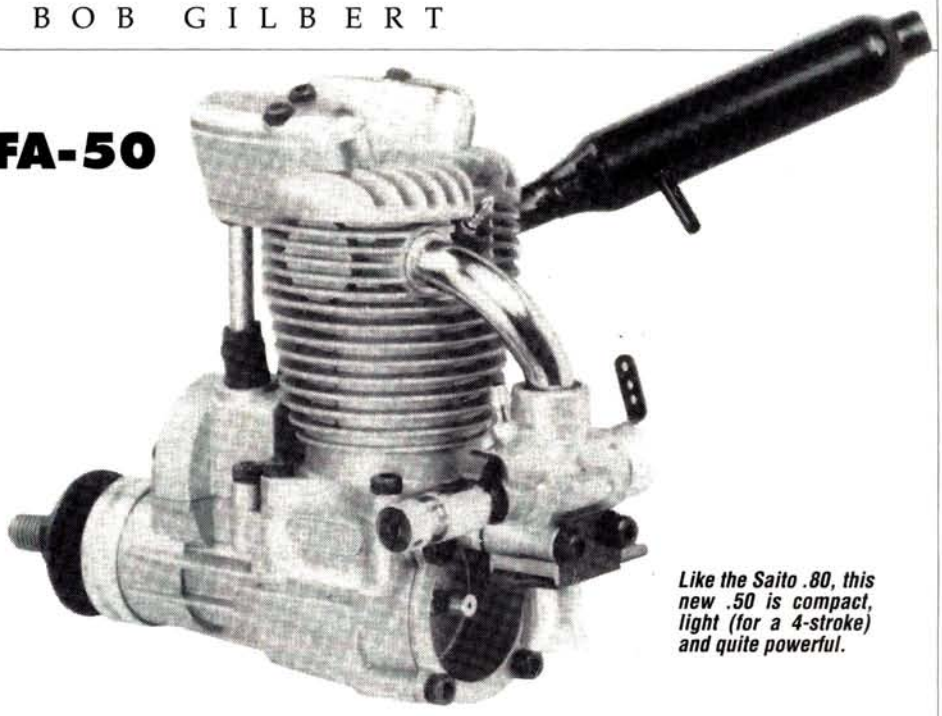


6. Glue brass grommets that match the axle through both sides of the pant. Make sure that they don't crowd the wheel. Slip the axle through the ply side piece, then through a washer, the wheel, a wheel collar and into the grommet on the outside side piece. Secure the pant to the axle with a landing-gear mounting bracket and two wood screws.

ENGINES ALOFT

BOB GILBERT

SAITO FA-50



Like the Saito .80, this new .50 is compact, light (for a 4-stroke) and quite powerful.

WHEN THE 4-strokes hit the market a few years back, I was one of the first to try them. The first 4-stroke I purchased was a Saito .30. What a neat little engine with exposed rocker arms. It ran OK, but owing to the carburetor's being mounted on the cylinder head, it was impossible to mount the tank properly, i.e., within 1/2 inch above the carb. When the second generation .30 came out, it had an intake manifold that positioned the carb much lower. I purchased the parts and made the revision. It then became a reliable runner. I mounted it in a Balsa USA Stick, and it saw many flights (and crashes) as I learned to fly R/C. Today, it has an honored spot in my small engine collection.

I went on to try other 4-strokes, and came to the decision that for my kind of sport flying, the 4-strokes just don't have enough power. To make my .60 4-stroke run with any reliability, I had to resort to an external pump. This is a feature I now see incorporated in more expensive engines. What really cured me of 4-stroke fever was replacing an expensive 4-stroke .60 with a 2-stroke .65 that cost half as much and supplied substantially more power.

Well, over the past five years or so, I've watched as others struggled less and less with 4-stroke-engine operation. The engines really did seem to be getting better, and the variety certainly grew. Multi-cylinder 4-strokes are "the thing" in scale now, because they operate reliably, really look "scale" and sound that way as well.

So into my life comes this Saito FA-50 to test, evaluate and report on. Distributed by United Model Distributors*, it looks like any other 4-stroke Saito (Saito builds only 4-strokes). First, I weighed it. (I know those 4-strokes are always way too heavy!) This one weighs 15 3/4 ounces, complete with its small, and not too effective muffler—not too bad, but certainly more than a 2-stroke .50. I'll go check a .50 2-stroke that's on my shelf. It weighs 18 ounces with muffler. Guess I was wrong, since the Saito weighs more than 2 ounces *less*. What a pleasant surprise!

The engine is attractive, and the carburetor is mounted at the rear, so the controls are a little farther from the prop than on the 2-strokes. That's a feature I've always liked about 4-strokes. I mounted the engine on the bench with the intention of running it only enough to ensure all the settings were correct and to verify that it would run reliably.

I mounted an APC 12x6 prop trimmed down to an 11 1/4-inch diameter. Using an electric starter for all starts, the engine always came to life right away. For this test, only standard 10-percent-nitro 2-stroke fuel was available, so that is what I used. Well, after only one tank of fuel, the engine was running quite well, and it even had a reliable idle below 3,000rpm. The engine would make the transition to wide-open throttle without hesitation. The running was quite smooth. Outside of adjusting the high-speed needle valve, no other adjustments were needed. Getting over 10,400rpm was easy, so I removed the engine from the stand and mounted it in my trusty Florio 40—a well-worn veteran of many engines and flights. All up, the airplane weighed 4 pounds, 14 ounces—not exactly a lightweight for a fun-fly machine. Then it was time to charge the batteries and get to the field for a real test up in the sky.

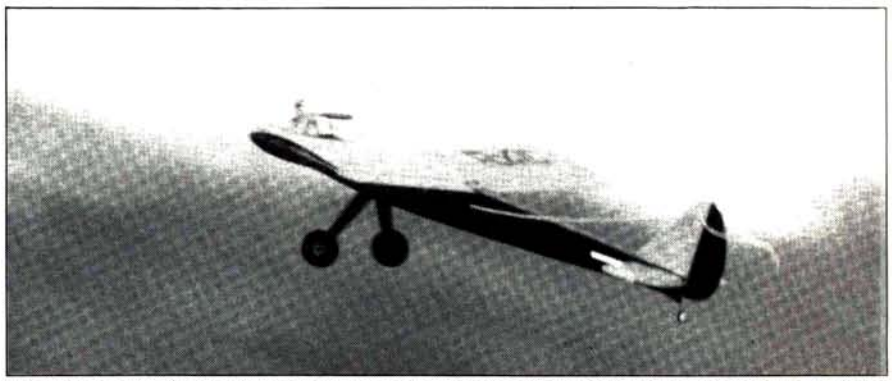
I was a little hesitant to show up at the field with a 4-stroke in a fun-fly-type airplane. Fun flys usually require gobs of power, and I had never seen a 4-stroke be competitive at one of these events, but I was eager to try it out.

Flight-test day arrived! The weather was nearly perfect—70 degrees or so and a light breeze—so off to the field we went. For these tests, Byron 15-percent-nitro 4-stroke fuel was used.

First on the agenda was the sound test, which is a requirement at our field. With the 11 1/4 APC prop I measured 93dB at 9 feet.

SUPPLIED ACCESSORIES

- Screwdriver for slow-speed needle adjustment
- Spanner (box wrench) for tappet-adjusting screw
- Two hex wrenches
- Tappet-gap gauge (for adjusting valves)
- Needle-valve extension bar
- Opening and closing bar for choke valve
- Knob for bar
- 10x12mm wrench for prop nut and muffler nut
- P-2 glow plug
- Two decals: "Saito FA-50"



The proof is in the "putting"! As with all the engines he inspects, Bob Gilbert puts the Saito FA-50 to the test where it counts—in the air!

It passed, but barely, so away we went to the flight line. While taxiing out, it was apparent that throttle response was excellent (one of the things that I really didn't expect).

Now for the moment of truth: I opened the throttle all the way, and away it went. The takeoff run was only a few feet, and I had anticipated a nice long run. As soon as it broke ground, I felt out the trim, and with that OK, I pulled up the nose. Is there a chance that this will climb vertically? It does, and then I add some aileron to see whether there really *is* any vertical speed. It rolls beautifully. Vertically! But then it runs out of steam and falls off in a stall, but at substantial altitude. I'm really impressed.

I then put it through all my standard maneuvers—loops, inverted flight and the like. Dave Baron takes the controls to show me how to do flat spins. He does one, then I try it. (He talks me through it.) We play with that for a while and I finally get into a flat spin, and recover just a few feet from the ground. Wow; that was fun! Through all the maneuvers, the engine didn't sag or quit, and that's what counts. When I throttled back, it became so quiet that I often thought it had died, but it never did.

Then Dave took up an Aerostar bipe up and we chased each other around the pattern for a bit, doing a series of touch-and-go's, and then I brought it in—all on one 8-ounce tank. It was a great first flight, and one with the kind of performance I really didn't expect.

Now, back to work. Let's try out some of the other props, to see whether things can be improved somewhat. Prop no. 2 is a Master Airscrew Antique 11x6. Takeoff is OK, but the climb is very poor. I'll take it around the patch once more and then try another.

Prop no. 3 is an APC 11x7. This one is as received and hasn't been trimmed (like prop no. 1). Well, this prop works well enough. On the ground, I get 10,700rpm, and the vertical performance is still very good.

Now I'll compare this .50 4-stroke to a good .50 2-stroke.

For outright performance, the 2-stroke has it all over the 4-stroke. In the same airplane, the heavier 2-stroke .50 had really high-speed vertical climb that could be continued until it was out of sight, and that was in the hot weather last summer.

The Saito .50 is pleasurable to own and operate. In the hands of an accomplished flier it could even be competitive in fun-fly events. It's a great engine for trainer and scale aircraft alike. Though it *did* measure 93dB on the sound test, that was at full throttle, and as soon as rpm were reduced, even a little, the sound level was substantially less. I'm sure it's capable of handling larger props, and that will help to reduce the noise it makes. Come to think of it, I never even changed a glow plug in all that flying.

Four-strokes are obviously here to stay. As a result of doing this test, I've gained great respect for the improvements that have been made in recent years. This Saito FA-50 is so easy to handle that anyone with just a little experience would have no trouble with it. The supplied tools are great, too. When the engine has been operated for a few hours, a valve adjustment will be in order. From then on, I'm confident it will be a consistently good runner.

Bob is extremely helpful. Many modelers drive long distances with "sick" engines, hoping for cures. Here, "Dr. Glow Plug" Gilbert is assisted by inventor Russ Pribanic.

**Here's the address of the distributor featured in this article:*
United Model Distributors, *301 Holbrook Dr., Wheeling, IL 60090.* ■

PILOT PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING

SEND IN YOUR SNAPSHOTS

MAN is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable.

All photos used in this section will be eligible for a grand prize of $500, to be awarded at the end of 1991. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to:
Pilot Projects, Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.

BEE-TWEEN FATHER AND SON

Thirteen-year-old Eric Foster is not only a good R/C pilot, but he's also a full-scale glider student. Full-scale dad, Ed, says, "The Bee-tween, which was built from *a Model Airplane News* pull-out plan, was an enjoyable project built from materials we had lying around the shop. It's fun to fly because it doesn't need a lot of space." Eric and his dad are both members of the Curtiss Wright Historical Association's Project Tomahawk—a group dedicated to restoring a Curtiss P-40B.

JACOB'S JENNY

After 14 months of searching and building, and using miles of rigging, Karl Jacob of Middletown, NY, completed his Curtiss Jenny, which started out as a Proctor kit. Karl labored very hard to machine and modify a C.H. ignition system so that it would fit into the cowl without destroying the scale appearance. Karl's Jenny also has spark advance that's independently operated—by the radio! A full-scale Jenny has nothing on the Jacob Jenny. Other Jacob Jenny features include: Laser 62 4-stroke power; operating cockpit sticks and rudder bars that move with the control surfaces; leather upholstery with belts; scale fueling location (in front of the fuel gauge); and 103 operating turnbuckles for rigging and control cables.

ROYAL GOONEY BIRD

A favorite of many scratch-builders out there has been the February '89 *Model Airplane News* plan of Dave Ramsey's DC-3. This RCAF version by Harry Smith of Gibbons, Alberta, Canada, resembles those that Harry used to work on in the 1950s. The model is powered by two Magnum .25 GP ABC engines. Harry knows how to build a great-looking model, and he knows how to take a great photo.

PILOT PROJECTS

WACO IN WAITING

The Western Michigan Radio Aircraft Flyers of Grand Rapids MI, are very proud of member Bud Chesebro. Bud built this 1/6-scale Waco YMF from a Pica kit. He used Solar Tex from England and painted it with K&B epoxy to get that scale fabric look. Bud is waiting until spring to launch the .91 Surpass-powered, 7 1/2-pound Waco. Fellow club member Bruce Bauley states, "Bud isn't one of our gentler fliers, and he wanted to show it off a little before it got hurt."

CANADIAN KILLER BEE

Marc Wald of Errington, B.C., Canada, sent in this astounding scratch-built Twin B—a relative of the Republic Seabee This 101-inch-span, 20-pound, Saito .80-powered amphibious beauty took Marc through a sojourn of document searching that lasted two years! He spent a lot of time just making the molds for the vacu-formed canopy window sections; never mind the rest of the project! This 1/5-scale amphibian with scratch-built, jack-screw-actuated retracts for realistic operation has logged over 25 flights! Marc says, "Takeoff runs are easily done on 3/4-throttle with the scale inboard and outboard flap at 30 degrees." Bravo!

SPECIAL-NESS RACER

Everett Ness from Columbia, SC, built this 88-inch-span Laird-Turner Racer from Wendell Hostetler plans. It's powered by a Sachs-Dolmar 4.2, and it's painted with NAPA 82-F-5707 Radiant Silver—a 1983 to 1985 Chrysler Corp. color. Everett appears to be a man of few words; he didn't tell us much about his beautiful model, but it's so pretty that we put it in anyway. The picture tells the rest of story.

Now that the project is complete, I'm certainly glad I stretched my model building experience by doing it. My general impression is that the finished product is a very accurate rendition of "the real thing," and the model's flying characteristics are spectacular. I give the P-40E a high rating for construction, appearance and performance. There are a few negative observations, too, which I will reveal in detail shortly.

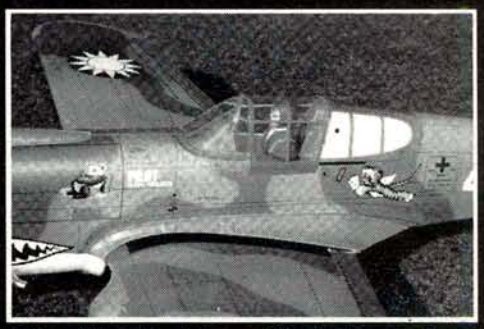
At the *Model Airplane News* editorial offices, it was decided that I should build two wings: one with fixed landing gear (the standard type, made of preformed music wire) and one with the 90-degree rotating-type retracts that Hobbico offers as an option. The two wings that I built are identical in all other respects.

SPECIFICATIONS

Type: Sport/scale ARF
Wingspan: 61 inches
Wing area : 605 square inches
Weight: 6 1/4 to 7 pounds (depending on engine and landing gear used)
Wing loading: 24.9 to 27.9 ounces per square inch
Length: 45 inches
Engine used: O.S. 70 Surpass
Power req'd: .45 to .61 2-stroke or .60 to .91 4-stroke
Prop: 11x7 APC
Airfoil: fully symmetrical
Built-in washout: no
Wing construction: inner balsa-and-ply structure covered with triple-ply, fully finished skin.
Kit construction: inner balsa-and-ply structure with triple-ply, fully finished skin.
No. of channels req'd: 4 (rudder, ailerons, elevator and throttle; fifth channel for retracts optional)
Sug. retail price: $299.99 (discount price, $179.99; retracts optional)

Features: the kit comes fully finished and detailed, and it includes an adaptable aluminum engine mount, a tank, pushrods, hinges, a scale spinner, wheels and virtually all the necessary hardware.

Hits:
• The Warhawk's biggest hits are its flight performance and its dollar value. When ARFs of this type first became popular in the mid 80s, they were expensive (many still are). The quality of the Hobbico P-40E is as good as that of any ARF we've ever reviewed. It sells for $180, but even compared with ARFs that sell for upwards of $250 (at discount prices), there isn't a $70 difference in quality or value.



Although the color of some of its plastic parts doesn't match the camouflage scheme, the Warhawk is still very attractive. All the detailing is done at the factory—even the markings!

• Its flight performance can be characterized as enjoyably exciting.

• Other hits are the parts-fit and the in-flight excitement created by its highly visible (though overly green) paint scheme.

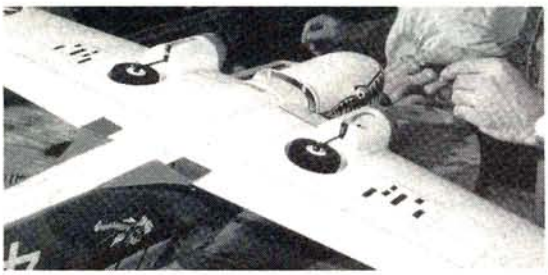
Misses:
• While the finish is a hit; it's also a miss. The color of the ABS parts doesn't match the rest of the paint scheme, but you can easily spray paint them.

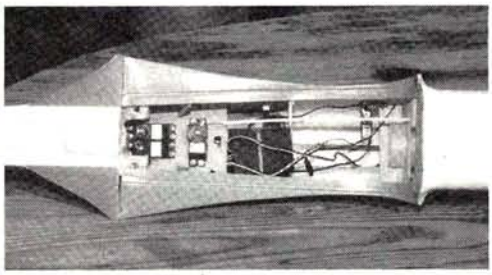
• To operate smoothly, the retracts need a lot of filing, and flat spots must be ground into the landing-gear rods to prevent slippage that will cause toe-in/toe-out changes.

THE FIRST STEPS

This kit includes much of the material a modeler normally furnishes to supplement an airplane kit, but you still have to buy a radio, an engine, a prop, a pilot figure, adhesives and fuel tubing. In my plane, I also used a remote glow-plug energizing harness and a fuel-filler fitting, both of which make it easier to prepare the plane for flight.

Construction isn't difficult, especially since so much has already been done for you, i.e., the control surfaces come hinged; all the exterior parts are painted and detailed; and the mating parts, which come cut and sanded, fit together very well.





Above left: Although the retracts can be "tucked" in place nicely, they require a lot of filing to relieve binding. Above right: Plenty of space made it easy to install the radio, but the model balanced 1/2-inch nose-heavy (even with the radio at the rear). Its performance was still outstanding, and its elevator was very effective during flared, three-point landings.

First I checked all the parts, as listed in the 36-page manual, and I found everything to be present and accounted for. After reading the manual through once, I started with the first step in the sequence of check-off steps: I checked the freedom of movement of the ailerons and the security of their hinges. There was minor binding at the ends of the ailerons, so a little careful sanding was needed. (The factory-applied plastic skins on the inboard ends hadn't been attached very carefully.)

Since the wings come in halves, the next few steps are devoted to joining them into strong units using 30-minute epoxy. In fact, I used 30-minute epoxy for most of the assembly. This led me to adopt a habit of planning each work session so that I always ended the day's effort with the gluing, and this allowed the curing to take place overnight. If you're looking for even faster assembly, however, there's no reason why instant glues can't be used throughout.

LANDING GEAR

I installed the landing gear in both wings. My experience with the fixed gear was great. The retracts, however, were another story. The fixed gear involved a few plywood and hardwood pieces and the music-wire gear legs, all of which were epoxied into wing recesses where they fit perfectly. The retracts also fit

FLIGHT PERFORMANCE

- **Takeoff and landing**
During roll-out, a lot of right rudder is required but, owing to good tail moment and rudder/fin proportions, it can be reduced quickly as air speed builds. Although the stock wheels are fine for pavement, they're too small and mushy for grass. We used 3-inch Du-Bro military-style wheels on the fixed gear and found that ground handling, even on grass, was very good for a tail-dragger. With the O.S. 70 Surpass engine, the plane was a little nose-heavy, but nose-overs are very controllable. (This is also because of the generous tail moment.) It's easy to set the rate of descent during final approach, and its

good penetration certainly helps in gusty and rough ground-wind conditions. The rudder is extremely effective at keeping the ship lined up during final approach. Although the P-40E isn't for beginners, its 600-plus square inches of wing area really put landings in the moderate- to low-stress zone for sport fliers. With the tapered trailing edge, flairs lock in easily and, once again, the tail moment keeps the tail down when the plane hits the ground.

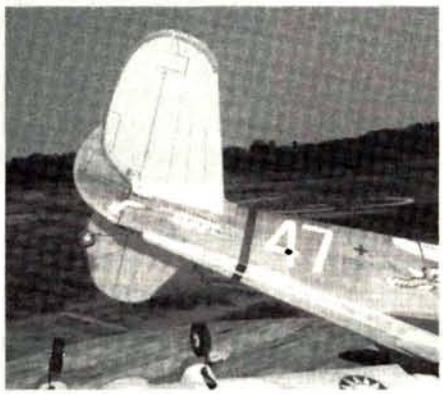
- **High-speed performance**
On the test-flight day, the wind was at about 10 to 15mph and quite gusty. Although the Surpass was swinging a medium-pitch 12x6 APC* prop, its speed and vertical performance were quite impressive. The controls are very crisp with a good-sense of neutral. High-speed snap exits are very predictable when done to the right, but the plane has a tendency to overshoot when exiting from the left. There wasn't even a hint of a high-speed stall during high-G conditions.

- **Low-speed performance**
During high-altitude, slow-speed stalls, the P-40E gently dropped its nose and usually its lower left wing, and it continued to fly in a slightly altered heading to the left. Again, the rudder effectively kept the Warhawk on heading during slow flight. The ailerons became less effective during slow flight, but they were far from useless. The model showed very little need for trim changes when going from low to high throttle.

- **Aerobatics**
The P-40 obviously isn't a pattern design, nor is it a pattern/scale hybrid. That being said, the Warhawk is very groovy during inside and outside maneuvers, and its rolls are only vaguely "barreled." Its snaps aren't the most aesthetically pleasing, but entries and exits are very predictable, especially to the right. Very little down input is required during inverted flight, and outside lift and maneuvers are almost as stable as inside. Its knife-edge capabilities, on the other hand, are fair at best. This could possibly be because of the plane's nose heaviness and the shape of the rudder's trailing edge. This is the first model I've flown that did tail slides prefectly time after time. It showed no tendency to dump over the top—very pretty. I'm not sure why the model is so good at this maneuver; maybe one of you can tell me.

well, but the rotation of the gear during cycling up and down was of high resistance—not good at all. My partner in this project was Chris Chianelli of *Model Airplane News*. When we discussed the very stiff operation of the gear, Chris solved the problem. He disassembled the retract legs and filed down their upper diameters where they're supposed to rotate within the retaining sleeves. As this filing progressed, the rotation improved noticeably. Eventually, both gear legs had been sufficiently modified to enable the gear to move up and down properly—by servo actuation alone. Hobbico needs to resolve this problem at the factory, however.

Later, when Chris tried to fly the model (which was our partnership arrangement), the retracts again proved a problem. We couldn't keep the gear legs tracking straight and true during takeoff. The right leg turned 90 degrees, which caused a high-speed turn and subsequent "pirouette." Except for a broken prop, there was no damage to the plane, but we couldn't solve the problem at the field that day. (A flat spot should be ground at the top of the gear where the retaining setscrew holds it.)



Although the kit comes with nylon clevises instead of metal ones, they seem to work well. Notice the toe-in problems in the extended retracts. This is solved by filing flat spots in the gear wires for the setscrews.

MORE CONSTRUCTION

The fit of the parts was excellent and, with the application of Pacer* Plasti-Zap where the plastic parts are joined, I had a very solid structure when it was complete.

When I installed the O.S.* Max 70 Surpass 4-stroke engine, inverted within the plastic cowl, I found that the room available was adequate, but not generous. Since it isn't feasible to remove the cowl for fueling whenever you start the engine, it's really essential to install a remote fueling valve, such as that made by Du-Bro.* Similarly, if your engine's glow plug is buried within the cowl, you'll need a remote connector to energize the plug at start-up. I used a Royal Products* remote wiring harness. It works flawlessly, and it's very easy to install.

I liked many things about building the P-40E and, of course, the speed with which it's possible to progress is one of these. Even so, as an ARF newcomer, it took me three weeks to complete both wings following all the building steps as set forth in the manual. When the plane was complete—all the parts assembled, the prop and the spinner mounted and all systems go—it was a very pretty sight! The color of a few plastic cover pieces that go in key places doesn't match the camouflage scheme on the skin of the basic parts. If you're a purist, you can paint these parts easily.

At this point, Chris took over the chores of testing (and enjoying) the project. (My eyes have tired in recent times, and my piloting days are limited. When I'm grounded, Chris takes over.) The rest of this article is his tale of valor and derring-do.

(Continued on page 92)

SMALL STEPS

RANDY RANDOLPH

A GOOD BEGINNER'S PLANE AND THE COX FAILSAFE MOD

THE TWILIGHTER *(Model Airplane News,* March '87 and December '88) and the Twiliter II *(Model Airplane News,* December '87) have been popular for quite a while, but, for some reason, interest has picked up again in the last few months. The airplanes were primarily designed as inexpensive, easy-to-fly machines that could be flown after work from somewhat restricted flying sites. It turned out they would also give someone a fighting chance to learn to fly R/C without the benefit of an instructor.

1. John Peterson's .15-powered Twiliter II on floats rests comfortably on a Texas lake.

The Twiliter was for the Cox* Black Widow .049 engine, and the Twiliter II, which is considerably larger, was for the .10s and .15s with their excellent throttles. Both airplanes flew on their wings and were quite gentle and relaxing fliers. The Twiliter II versions make quite satisfactory seaplanes when equipped with floats. The Twiliter II in photograph 1 belongs to John Peterson of Decatur, TX. John writes:

"I first saw the Twiliter II in the October 1988 issue of *Model Airplane News.* That's the issue in which the full-size plans for the floats appeared. I fell in love with the little plane then, and even more after flying it. It's a refreshing break from big and fast.

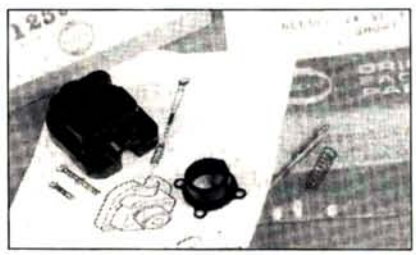
"It was my first scratch-built project and was built from all contest-grade balsa, covered with MonoKote, powered by an O.S. .15 and equipped with a Futaba radio. Total weight is 3½ pounds, and it has a glide rate that has to be seen to be believed! On a calm day, it gets twice the flight time of my Seamaster! Of all my airplanes, the Twiliter is my favorite."

2. At last, SMALL T-shirts are available so we can advertise that we love small airplanes.

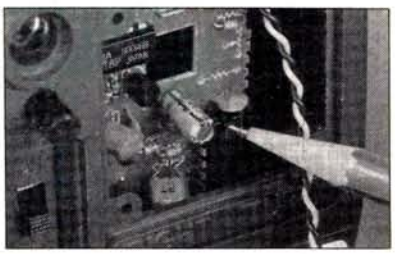
That's high praise, indeed, for a simple slab-sided water-bug-looking airplane.

The good-looking guy with half a head in picture 2 is Monty Rorie, and he's modeling the official SMALL T-shirt. The Dallas R/C Club (8328 Barbaree, Dallas, TX 75228) is offering these shirts to anyone who loves small model airplanes. They cost $20, postpaid, and they come in medium, large and extra-large sizes. Proceeds from the sale of these shirts will go to Dallas R/C Club field improvements. Incidentally,

(Continued on page 92)



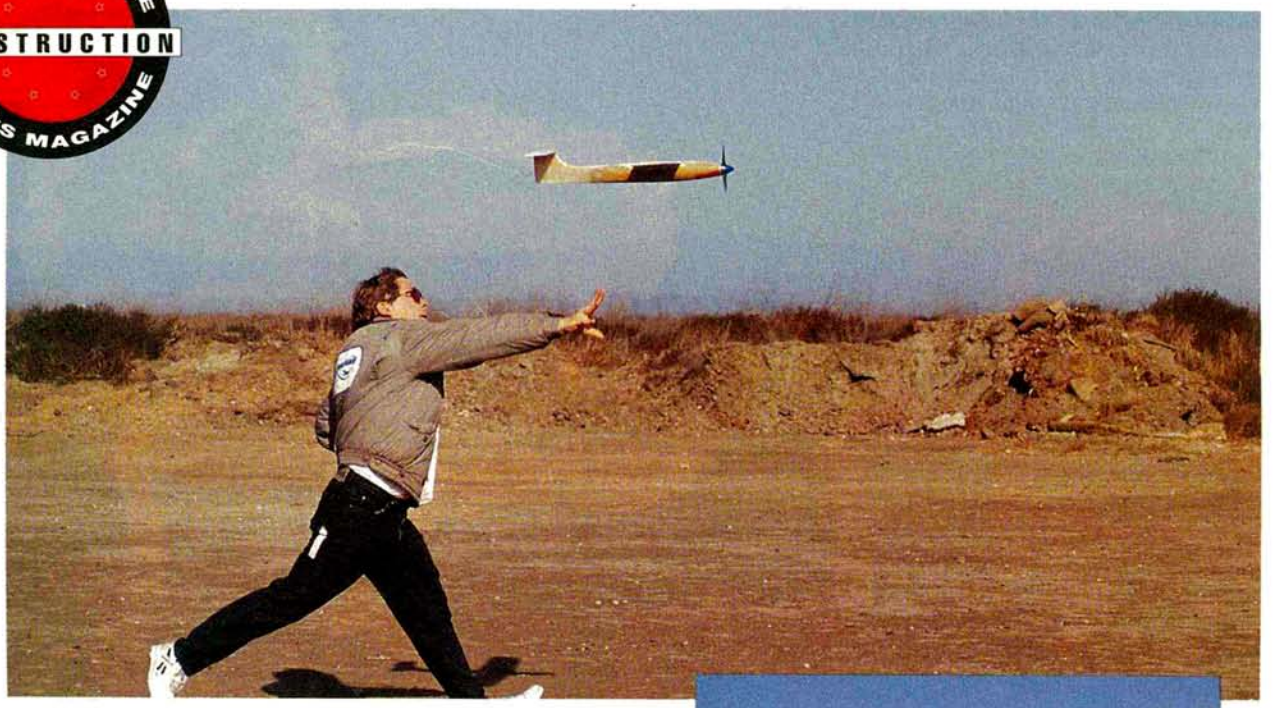
3. After all the talk about an external tank for Cox engines, Cox had the answer all the time!



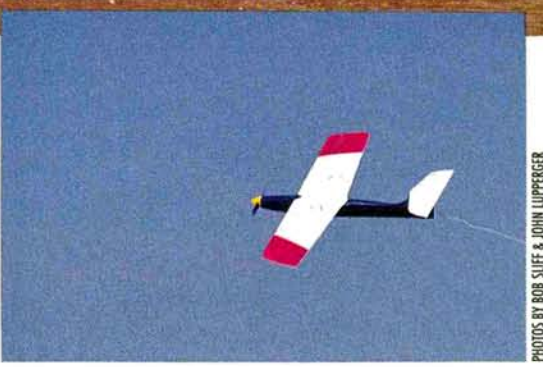
FAIL-SAFE RADIO

The Cox Failsafe radio system is about the least inexpensive way to achieve single-channel control for ultra-small airplanes. The system makes use of two buttons—one for a left turn and the other for a right—to transmit commands to the airplane. When a button is pushed, the command lasts only about 2 seconds, and the surface then returns to neutral. To achieve more control, the button must be pushed again. This is actually the fail-safe part of the system because it practically eliminates the dreaded spiral dive that comes from disorientation. If the airplane is trimmed correctly, it's possible to fly it by simply turning the trim dial from one side to the other for small amounts of left and right rudder.

If desired, however, the fail-safe system can be disabled so that the rudder will stay deflected as long as the button is pushed. To do this, pry the right bottom panel up from the transmitter case with a screwdriver as shown in the picture. This will expose the circuit board below. Short together the two terminals of the electrolytic condenser (pointed out by the pencil in the second picture). This is most easily done by soldering a short jumper between the terminals on the rear of the circuit board. To return to the fail-safe system, simply remove the jumper.



Steve Neu launches Jerry Bridgeman's Cad-Cat.



PHOTOS BY BOB SLUFF & JOHN LUPPERGER

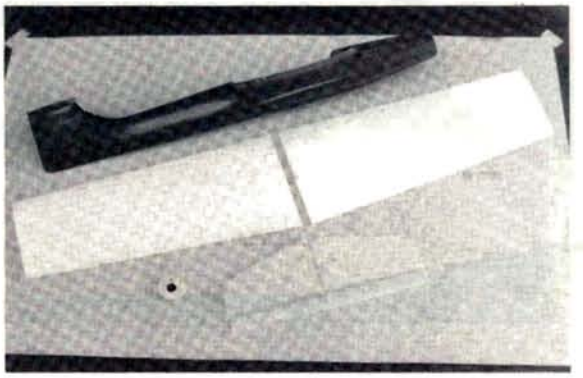
CAD CAT

BUILD THE '91 ELECTRIC PYLON NATS WINNER

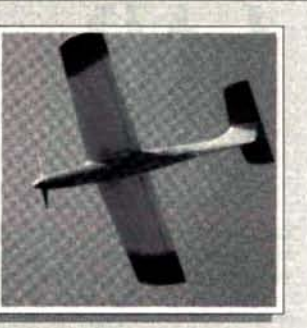
by STEVE MANGANELLI & STEVE NEU

THE CAD-CAT is the umpteenth in a series of 05-size electric pylon racers designed by Steve Neu and/or me that have evolved in parallel with the development of commercially available motors. My first design, which I called a racer (its planform was similar to that of the Cad-Cat), was designed in about 1978 to compete in electric aircraft pylon races in Southern California. Notice that I refrained from saying 7-cell, as the "05/7-cell" connection hadn't yet been made. Some folks were running Twin Astro 02s, but the majority were running Astro* 05 can motors with eight 550mAh cells. We were flying a short 1/2A course (about 30x88 paces). Nobody measured; no one much cared. The only rule was to have fun! I think the grudge matches for a buck a heat after the official contest was over were the most fun of all.

Steve Neu went to a trade show and found a new motor. This motor wasn't much compared with today's Cobalts, but it was superior to the 05 can motors. Steve immediately improved his placings! As this motor was originally a car motor, it was designed to run on seven cells rather than on eight. A couple of members of the



Parts is parts! The glass fuselage and foam wing cores are shown almost as they're supplied from Hobby Horn, although your fuselage probably won't be painted. The 3/32-inch-thick sheet horizontal stabilizer and simple one-piece elevator are shown cut out and ready for finishing. Note that the 1/8-inch plywood is shown here rather than the .090-inch-thick glass circuit board for the firewall.



SPECIFICATIONS

Type: Electric pylon racer
Wingspan: 31 inches
Weight: 32 to 34 ounces
Wing area: 179 square inches
Wing loading: 25.7 to 27.3 ounces per square foot
Surface loading: 21.3 to 22.55 ounces per square foot (per FAI rules, includes the stab surface)
Length: 26 inches
Power req'd: Astro FAI 05 Cobalt, or equivalent
Battery: 7 1200mAh Sanyo SCRs
Propeller: Taipan or APC 7x6, or equivalent
Approximate speed: 90 to 110mph (across 150-meter course)

Features: the version discussed in this article has a fiberglass fuselage and sheeted foam wings. A plan is also available with a suggested built-up structure. Although the author discusses an on/off motor control, a speed controller can also be used.

Comments: Steve Neu flew his Astro FAI 05-powered Cad-Cat to a 1st-place victory in electric pylon in the 1991 Nats. If you're an experienced aileron flier, and you want a taste of high-speed, high-tech electric pylon racing, this state-of-the-art ship makes it possible for you to go for the gold.

no rules/have fun committee then legislated against seven cells when they held their contest. That sort of started the slide into oblivion for this group. After a while, Leisure Electronics* began importing this motor, which put that company in the airplane electric-system business.

In the meantime, the European competitors developed a pylon race based on a model that weighed 2.5 kilograms (5.5 pounds). Although this class was in the 1986-87 FAI section of the AMA rule book, it didn't last. The next set of FAI rules offered a new class for 7-cells. The Germans call this the "Schnuppi-Klasse." The current rules use a long 180-meter course that makes it more of an enduro race, but it doesn't look as if the Europeans want to change it to a shorter course. Still, the Cad-Cat is a good model to use for either the short American course or the long European course.

THE CAD-CAT WAS A HOLY TERROR FROM THE BEGINNING. HAVING ONE RIGHT-HAND PANEL AILERON REALLY HELPED IT GROOVE AROUND THE PYLONS—NO NEED TO BE GUN-SHY ABOUT FLYING LOW; JUST BANK IT AND YANK IT.

What does all this have to do with the Cad-Cat? Werner Detweiler inspired us to build it. He flew his Race Cat at the 1988 St. Louis F3E World Championships. There, he took on a Quicky 500 (medium speed) and beat it. The Cad-Cat is a close cousin of Werner Detweiler's Race Cat. Our technical knowledge of the Race Cat came from a small three-view that was published in the St. Louis WC Newsletter, and it was later published with the airfoil template in the September '89 issue of *FMT (Flugund Modell-Technik)*—a major German model magazine. (By the way, the Race Cat shouldn't be confused with the Race Rat kit marketed by Hobby Lobby.) Though the Race Rat was designed by Werner (a Graupner employee) as a scaled-up Race Cat, the Race Rat is about 40 percent larger with a polyethylene fuselage and a built-up wing.

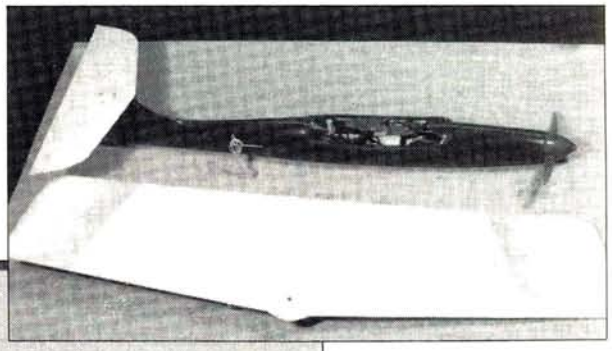
The Cad-Cat was derived by magnifying the small magazine three-view using an overhead projector. We then made a few artistic swipes at the fuselage outline to reduce the fuselage width, while we deepened it to clear the brush holders on the Astro Cobalt 05 and to provide some additional internal room. The wing airfoil and planform are very similar to those of the Race Cat. A plug and mold for an epoxy-glass fuselage were made and a few foam wing cores were cut. We were in business!

The Cad-Cat was a holy terror from the beginning. Having one right-hand panel aileron really helped it groove around the pylons—no need to be gun-shy about flying low; just bank it and yank it. The adverse yaw caused by deflecting right aileron in left turns helps to hold the nose up and minimizes the requirement for corrections in the middle of a turn. The 1990 U.S. F3E team took five or six Cad-Cats to Europe to fly in the international contest that was held before the F3E World Champs. Against the experienced Europeans, the U.S. fliers did OK, with Jerry Bridgeman placing 4th. Our team felt that the Cad-Cat was definitely in the same class with the best European ships. The only new trick we needed to learn was how to carve the props.

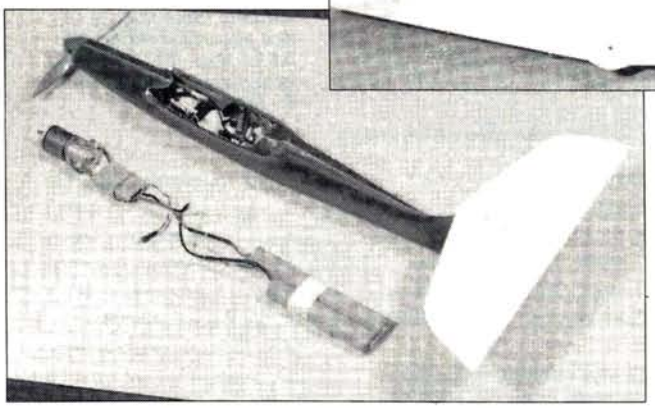
The completed balsa-sheeted wooden wing. Note the outline of the turtle deck and the inboard aileron.

Our motivation for publishing the Cad-Cat is simple, but somewhat selfish: we want more people to race against! After listening to considerable whining about no one wanting to race against us, Bob Sliff pointed out that, though there are some wooden kits on the market (i.e., his Fast Eddie and the Graupner* Race Rat), none is really competitive. So, why not publish an article about the Cad-Cat? Glass fuselages and foam cores aren't everyday fare for scratch-builders, but fret not! Bob Sliff's

CAD CAT



Steve Neu's prototype molded-wing Cad-Cat features an optional bolt-on stabilizer (mentioned in the text). The receiver antenna is coiled up for neatness, but it must trail out the back for flying.



The power train shown next to the completed fuselage is in its approximate mounting position. The motor is mounted on the back of the firewall; the on/off speed controller essentially hangs from the motor wires; and the unconnected wire shown plugs into the receiver. It doesn't get much simpler. The motor shown is a Keller 25 series. The motor in the model is essentially a Graupner Ultra 800. The relay shown is the one mentioned in the text. The batteries are seven 1.2Ah Sanyo SCR "red cells" connected in one stick of three and one stick of four.

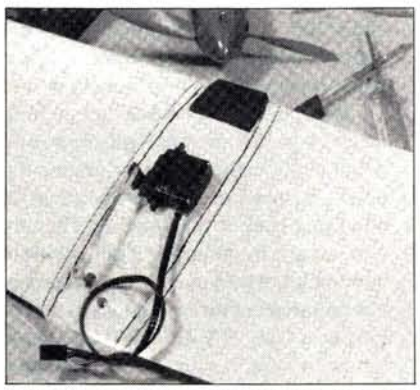
part in the scheme is to make sure that at least the fuse and foam-cores are available through Hobby Horn*. Once you get the fuselage and cores, you're two-thirds finished, so let's get busy. *[Editor's note: for those who prefer to build with balsa, we're providing a second plan for the wooden version of Cad-Cat, which comes with instructions. Both plans as published include an optional left aileron.]*

WING

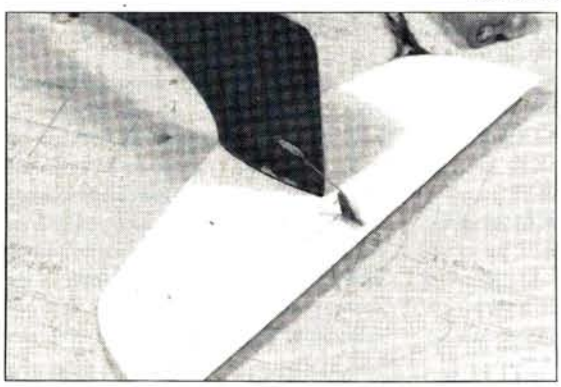
Select four sheets of firm, straight-grained, 1/32x3x36-inch balsa. (I've found that the thickness and the density of this stuff varies.) Glue it up edgewise, and cut it up into four pieces that measure about 1/4 inch larger in length and width than each wing half. Sand the seams smooth.

Align two skins on top of each other, and tape around the trailing edge with one continuous piece of masking tape. This gives you a shape something like a pair of taco shells. Test the foam-cores for fit, and if it's satisfactory, squeegee some slow-drying epoxy over the skins. (Hint: a cut-up lid from a butter tub makes a great squeegee.) Slip the foam-cores back into the "taco shells," and put the assembly back into the foam cradles. Align the wing cores and sheeting, and drive a couple of straight pins through the entire mess to prevent things from shifting around. Repeat this process for the other side.

Stack the enclosed halves on top of each other, and place them on a flat surface; place a plank on top of them and 50 pounds of something on top of the plank. When the epoxy has cured, trim the wings down to the shape shown on the plans.



The aileron servo is mounted on its side in this picture of Steve Neu's model. This might be more convenient if your servos are small enough to fit this way. Also note that a piece of sticky-back foam is used in place of the hardwood split dowels for forward wing locating. Either way, it's easier than the conventional dowel that fits into a hole in a bulkhead technique.



The upside-down fuselage shows the elevator pushrod exit and horn. Just make sure that everything is slop-free and that the throw and control direction are correct. Use a Z-bend at this end and a clevis for adjustment at the servo end. The "San Diego Amp Works" noted on the plans isn't some mysterious commercial activity; it's just my workshop!

Make up the wings tips as shown. Glue the tips and the leading edges to the wing halves, and carve and sand the wing panels to shape. Bevel the center section to achieve the proper dihedral angle. Block up one tip by 1/2 inch, and join the wing halves.

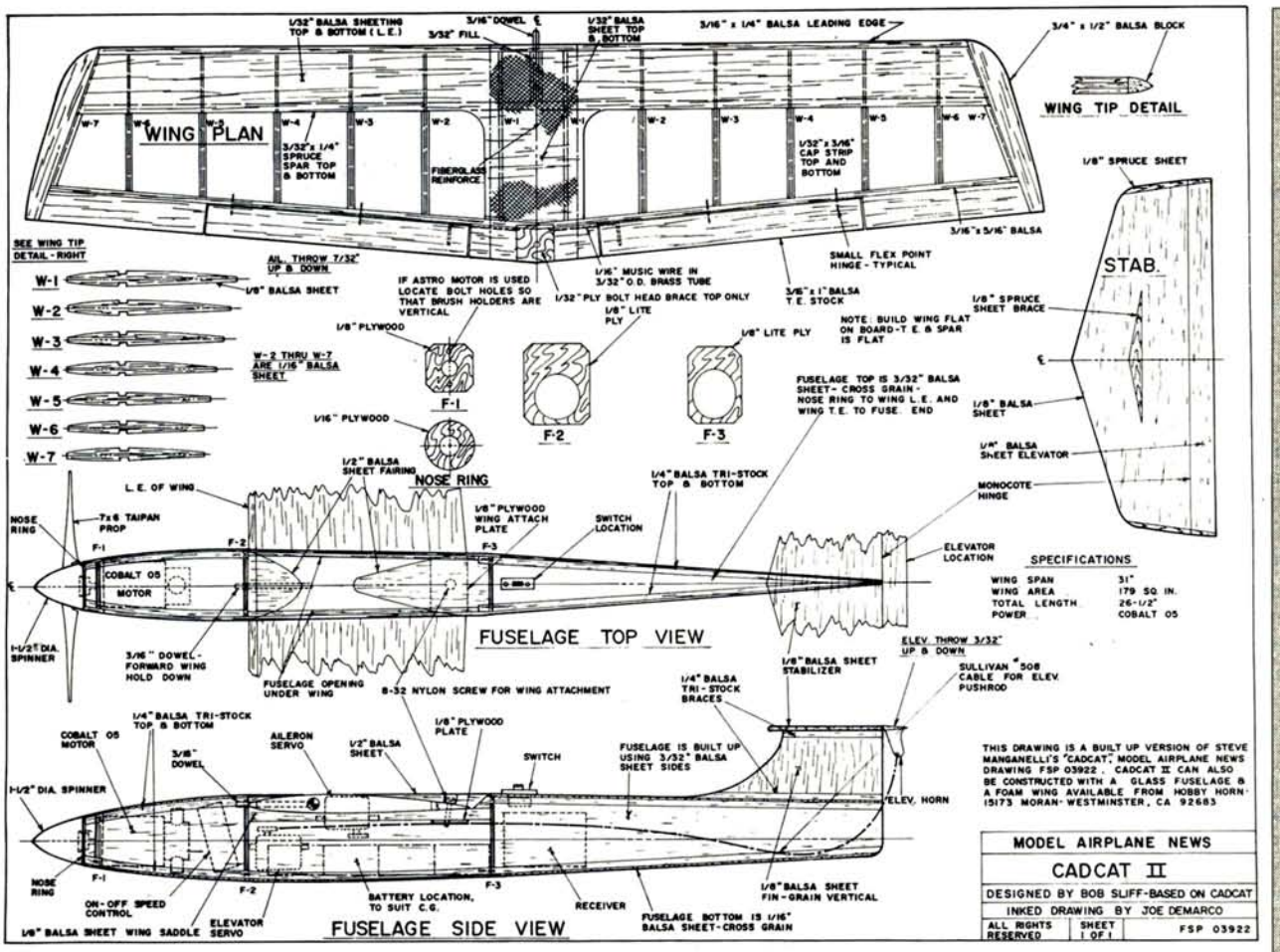
Cut the aileron free from the right wing. Affix the wing trailing-edge cap and aileron leading edge. Bevel the aileron leading edge to the cross section shown.

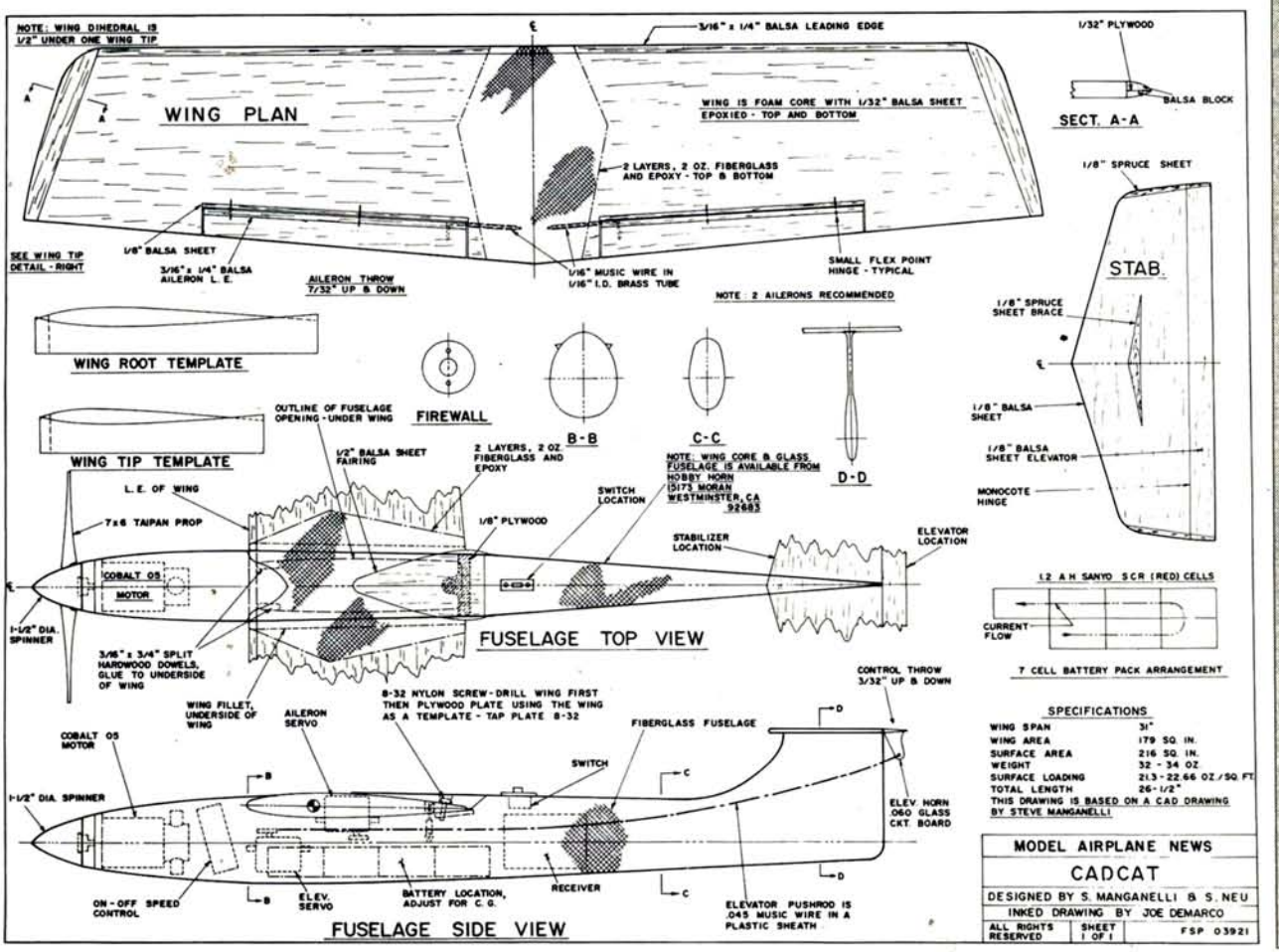
From the bottom, make a slot in the wing root for the torque rod/tube assembly. Install the tube assembly and add some scrap fill, and carve flush with the adjoining wing. Check for freedom of movement. Glass the center section's top and bottom as shown, and fit the wing to the fuselage. Make and install the turtle deck. Carve it to the outline shown on the plan, and blend it to match the fuselage contour.

Cut out the opening for the aileron servo. Cover the wing and aileron with your favorite iron-on covering. Install the aileron using the torque rod as one hinge and two other small pin-type hinges as shown. Seal the gap using a strip of covering material on the underside of the wing. Install the two hardwood split dowels to the wing. These dowels locate the front of the wing on the fuselage.

FUSELAGE

There are many ways to finish a glass fuselage. Here's mine: sand off the mold flashing where the halves are joined. Open up the wing opening to approximately 3/8 inch from the perimeter. I prefer to mount all the goodies while things are still sort of transparent.





ORDER THE FULL-SIZE PLANS...PAGE 132

FSP03921; FSP03922

CAD-CAT

$6 EACH; $10 (BOTH)

Designed by Steve Neu and Steve Manganelli, this racer was flown by Neu to a 1st-place victory in electric pylon in the 1990 Nats. Clocked at more than 90mph, the plane is for experienced aileron fliers who want to try state-of-t' e-art electric pylo, racing. It doesn't require a huge flying field. Plan no. FSP03921 shows component layout for the composite version (sources for the fiberglass fuse and foam wing-cores are noted in the March '92 construction article). A second plan, FSP 03922, by Bob Sliff, shows a suggested wooden structure for those who want to use built-up construction methods (plan includes a separate instruction sheet). WS: 31"; L: 26"; Motor: Astro FAI 05 Cobalt or equivalent. LD: 2, 1 sheet

CAD CAT

Make the firewall, and screw it to the motor without the drive hub. Mount a prop and spinner to the drive hub. Feed the motor into the fuse through the wing opening. Slip the spinner/prop/hub assembly onto the motor shaft. Make sure that the spinner is aligned completely with the fuselage. Chances are it won't be, and you'll have to trim the firewall several times to achieve alignment. Once alignment has been achieved, disassemble the fuselage one last time, scuff-up the "bonding" area, and clean it with acetone. Apply a ring of epoxy to the inside of the fuse where the firewall fits. Reassemble and put a rubber band around the fuse to clamp it to the firewall. Let the assembly cure standing on the spinner. The firewall is capable of distorting the shape of the fuse; so watch for that.

Test the wing/fuse fit if you haven't already succumbed to the urge to see how the two look together. File or sand the fuselage, if necessary. Make up and install the casing for the elevator pushrod and the plywood platform for the rear wing-mount bolt. Again, scuff up and clean the bonding areas of the fuselage with acetone. Don't drill the hole for the bolt at this time.

I now declare the fuselage ready for painting. There are lots of ways to finish a fiberglass fuselage. Here's how I do it:

- Use warm water and cleanser to remove all traces of mold-release products.
- Rub spackle into the pores of the glass with your fingers. After it has dried, sand away the excess, then repeat the process.
- Prime it with automotive lacquer primer, and fill the imperfections with auto spot putty. Wet-sand and repeat this process until you're satisfied (or until you get tired of it).
- Paint it. (Cheap discount store stuff is fine with me.)

The drive hub on the motor shaft with the spinner and prop removed provides access to the motor-mounting screws. The motor and speed controller are fed in from the wing opening. Twisting the motor by its shaft may aid in lining up the holes in the firewall with those in the motor. Selecting a suitable 1 1/2-inch spinner is harder than it should be. The popular brand with four snapping pins is very difficult to assemble properly so that it stays balanced. A much better spinner, though more expensive, is the Tru-Turn* aluminum spinner. (The spinner shown in this photo was salvaged from a ready-to-fly Japanese kit.)

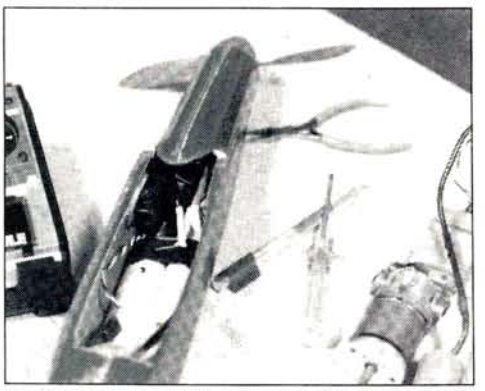
HORIZONTAL STAB

There's no trick to this. Just cut the stab out of medium sheet stock, glue on the hardwood reinforcements, sand and cover. A covering or a tape hinge is acceptable.

FINAL ASSEMBLY

Align the wing with the fuselage. Using the 8-32 tap drill size, drill through the wing and the 1/8-inch plywood rear-wing mounting plate. Tap the wing-mounting plate to accept an 8-32 screw, give it a shot of thin CA, and tap it again. Enlarge the hole in the wing to give it clearance for the 8-32 screw. Trim the covering from where it fits on the stab platform, and epoxy it to the fuse. (Alternate method: bolt the stab to the platform using two 6-32 nylon screws. One screw should go through the hardwood reinforcement, the other, near the leading edge. There should be sufficient filler in the top of the rudder to drill and tap. If there isn't, add some.

A recommended motor control for this model is an electronic on/off device made from a hefty relay and some electronic parts that are very similar to a standard servo amplifier. No need to scurry to an electronics parts store. The relay with heavy contacts and a 5V coil is an oddity that's made by special order and in bulk. The Becker 30-amp, a finished electronic on/off device that's complete with wires and a Futaba* or Airtronics* compatible connector is available for $32 from Hobby Horn or Brian Chan*. A few other such devices are on the market, but they typically can't handle the high current. A properly rated speed controller can also be used for motor control. All you need to do is solder the device to the motor, and leave just enough wire to position it as shown on the plans. On the other end, connect the wires to the plug that mates to your battery pack. Install the motor assembly, the prop and the spinner.



An Airtronics transmitter, a spare power train and the components inside the fuselage. The white cylinders are the motor battery pack, and the elevator servo is in the upper left corner of the fuselage wing opening. This model doesn't feature the Velcro® battery retaining strap described in the text. Servo tape is OK, though permanent. Flying time will be limited by the rate at which you can cool down, then recharge one battery pack. Distinctive-looking APC* props really work well on electric applications. Before APC, we used the Taipan 7x6 now available through the Midway Model Company*.

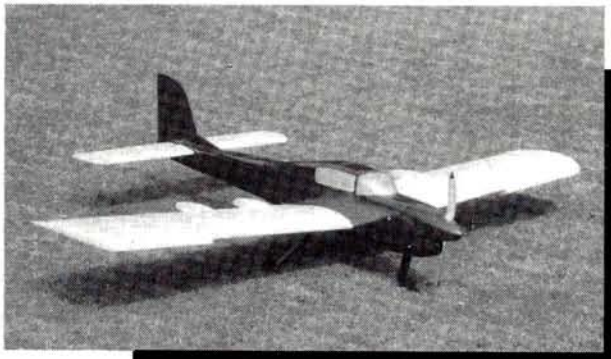
Mount the servos as shown on the plans, and test for smooth operation, proper direction (i.e., up is up) and specified throw. The aileron linkage is either a commercial 1/2A type, or simply 1/16-inch music wire and 3/32-inch brass tube. Install the switch where shown. This location prevents inadvertent shutoff during the hand-toss. Besides, it's the only area with adequate room for a switch. Pack some foam around the receiver, and slide it into the tail section of the fuselage where shown. Route the antenna out through the side of the fuse, and tape it to the vertical fin at the back. Squeeze in a 100mAh receiver battery pack next to the speed controller. Finally, assemble and insert the motor battery pack. Move it around to achieve the proper center of gravity (CG). Make a mark on the fuselage floor at about the center of the battery pack.

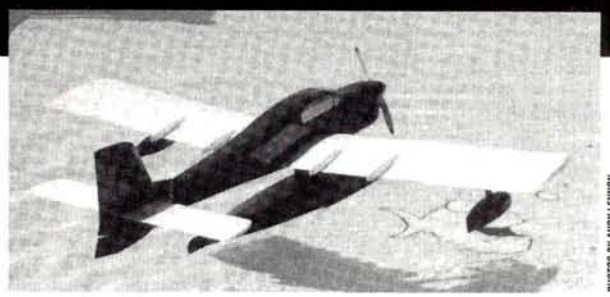
We've been experimenting with Velcro® to retain the batteries in the fuselage. It's semi-flexible, removable and convenient. You'll need about 6 inches of the 1-inch-wide stuff that's available

(Continued on page 93)

Improve Performance by Reducing Drag

PART 3 • by ANDY LENNON





1. Left: the Seahawk at rest.

2. Below: the Seahawk on its single float. Note the sub fin below the horizontal tail plane.

PHOTOS BY ANDY LENNON

THIS FINAL part deals with fuselage, landing gear and overall design for drag reduction and goes on to discuss the design of the Swift based on this series.

FUSELAGE

The fuselage with the lowest drag coefficient, fuselage no. 1 in Figure 1 (Part 1), isn't entirely practical for an R/C model that seeks to simulate the appearance of its full-scale big brothers.

The basic low-drag features may, however, be incorporated. Such a model is shown in Photo 1, the Seahawk. Photo 2 displays this airplane on its single float, and Photo 3 shows the large Youngman flaps, fully extended, that are very effective.

At a gross weight, on wheels, of 110 ounces, powered by an O.S.* Max .46SF engine turning an APC* prop of 11 inches diameter by 8 inches pitch, this model's performance is thrilling and justifies the drag-reducing techniques in this series of articles.

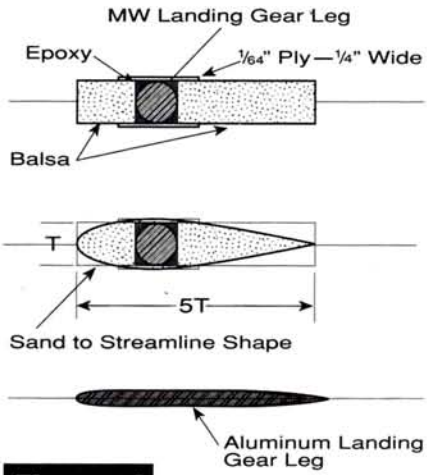


Figure 1
Streamlining Landing Gear Legs

In plan view, the fuselage sides should be straight and parallel at the wing-fuselage intersection (Figure 2) to avoid separation drag. Reflexing starts just after the wing trailing edge.

The angle of incidence at which the wing is set relative to the fuselage center line is important.

It's safe to assume that the fuselage's lowest drag occurs when it's flying, in level flight, with its center line horizontal.

The wing's being fixed to the fuselage will cause variations in the fuselage's center line attitude. At low speed, the wing must operate at a higher angle of attack to provide adequate lift for level flight. At high speeds, lower angles of attack furnish the needed lift. Hence, the fuselage's center line departs from the horizontal, nose up at low speeds, and nose down at higher speeds, both with increased drag.

The solution is to select a level-flight cruising speed and to adjust the wing's angle of incidence to provide the lift needed for level flight at that speed. At other speeds, the increase in fuselage drag must be accepted. Figure 4 of Part 1 of "Design for Flaps" in the October '91 issue —the lift, wing loading and speed chart—is very useful in this connection. Proceed as follows:

From the wing loading of your model at the bottom of the chart, read upward to the cruise speed you've selected. Where the vertical and horizontal lines intersect, you'll find the lift coefficient needed. For example, a wing loading of 24 ounces per square foot at 60mph needs a lift coefficient roughly halfway between CL 0.15 and CL 0.20—say CL 0.17.

Refer to the lift-drag curves for the wing airfoil of your choice, and determine the angle of attack for CL 0.17. Using the Eppler E197 (of Figure 1 in Part 2 of this series) as an example, an

Tips on wing incidence, landing ge

angle of minus 0.5 degree will produce CL 0.17. To this should be added another 0.5 degree to adjust for the wings aspect ratio of 6, and the rectangular planform, bringing the angle of attack to 0 degrees.

In your design, the angle of incidence of the wing to the fuselage center line would be 0 degrees to obtain the lowest fuselage drag at the 60mph cruise speed.

LANDING GEAR

This necessary, but drag-producing, appendage provides a significant opportunity for reducing drag.

Photo 4 shows the tricycle landing gear for a recent model. The nose and main struts are 5/32-inch diameter music wire, faired with balsa and 1/64-inch plywood as shown in Figure 1, and sanded to a streamlined cross-section. The wheels are Kraft 2 1/4-inch diameter, of streamlined cross-section; Williams Bros.* supply similar wheels in their Smooth Contour Line.

Aluminum landing-gear legs should have rounded leading edges and trailing edges tapered to an almost knife edge as in Figure 1.

OVERALL DESIGN

Good overall design will do much to reduce trim drag, described in Part 1.

A shoulder or mid-fuselage wing location, along with a high thrust line (inverted engine), will bring the centers of lift, thrust, gravity and drag very close to one another, thus minimizing the horizontal tail's load, reducing its, and the wing's, induced trim drag. The model will also be more nimble.

THE SWIFT

This model aircraft's design was based on the concepts in this series, and on the two-part series "Design for Flaps" (October and November '91 issues). Figure 2 is a three-view drawing.

This is a small, fast, highly maneuverable model, but with flaps down 40 degrees, the plane will stall at 17mph. A "safe" landing speed would be 25 percent greater, or about 21mph. Top speed is estimated at 90mph. *Total drag* at 50mph is estimated

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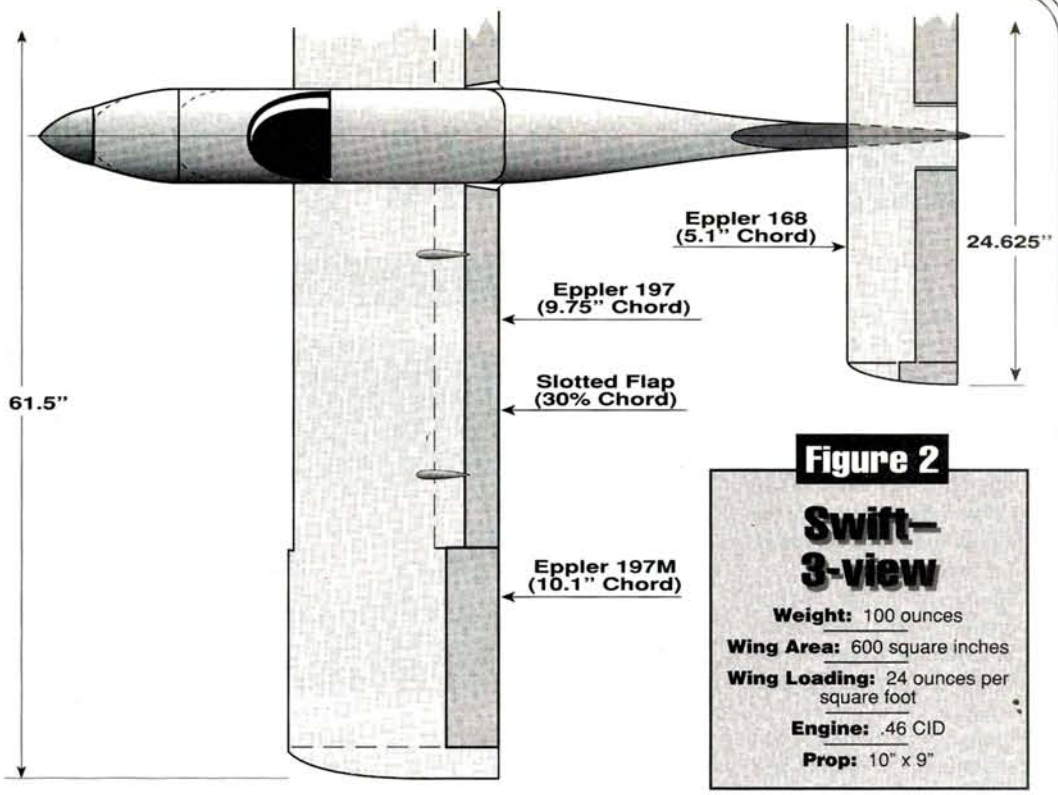
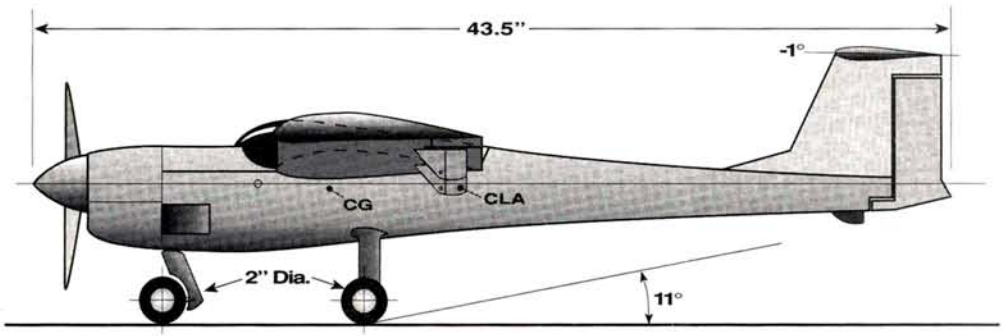
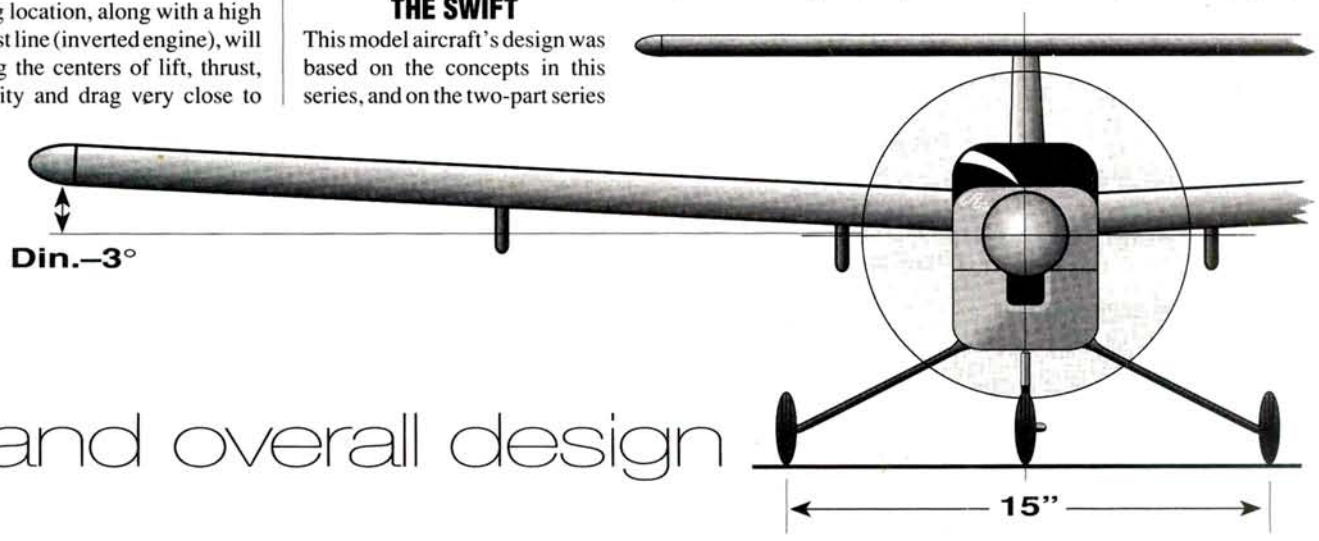


Figure 2

Swift–3-view

Weight: 100 ounces
Wing Area: 600 square inches
Wing Loading: 24 ounces per square foot
Engine: .46 CID
Prop: 10" x 9"





ar and overall design

Reducing Drag, Part 3

(Continued from page 45)

at 12.5 ounces, *including* wing and tail surfaces. At 90mph, this would increase to 42 ounces. The T-tail location was chosen to remove it from the fuselage boundary layer and the propeller slipstream into undisturbed air. Since this location results in only two corners, instead of the four of an in-fuselage location, drag is reduced.

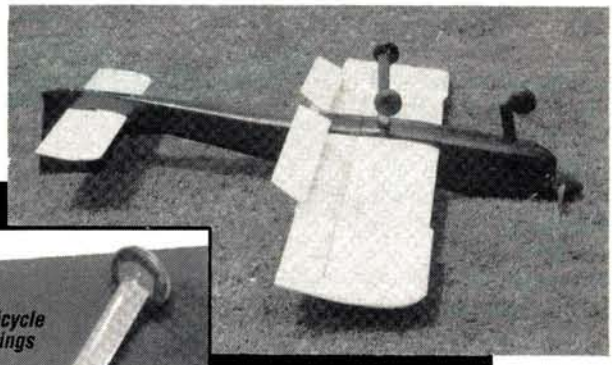
The transmitter and receiver should have one extra channel of "proportional" nature so that flap extension may be tailored to the flying speed desired.

Figure 3 provides wing and tail-surface airfoil profiles and control-surface throws.

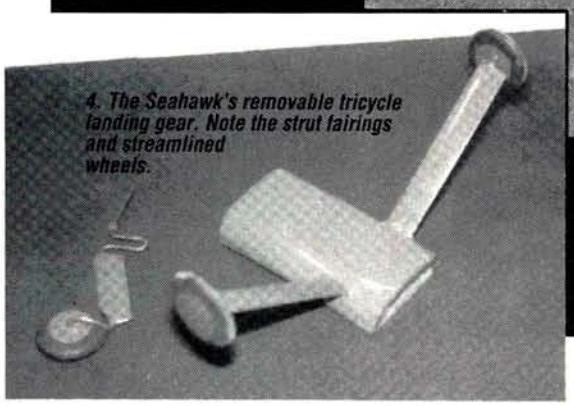
Ailerons, elevators and rudder are mass-balanced for flutter prevention. In a dive, this model's speed would be high.

A feature of this model is the removable fuselage top, from firewall to just aft of the wing. It's held by dowels at the front and one nylon bolt at the rear. Its easy removal provides access to all servos, receiver, fuel tank and nose-wheel linkage, etc. This is a real convenience.

Note that the flap width is 30 percent of the wing's chord, rather than 25 percent. This provides greater drag when it's extended for a landing. The Swift is very clean aerodynamically, and the additional drag of the wider flap will prove beneficial.



3. Above: the Youngman flaps fully extended. The four fairings on the top trailing edge of the wing house the flap pivots.



4. The Seahawk's removable tricycle landing gear. Note the strut fairings and streamlined wheels.

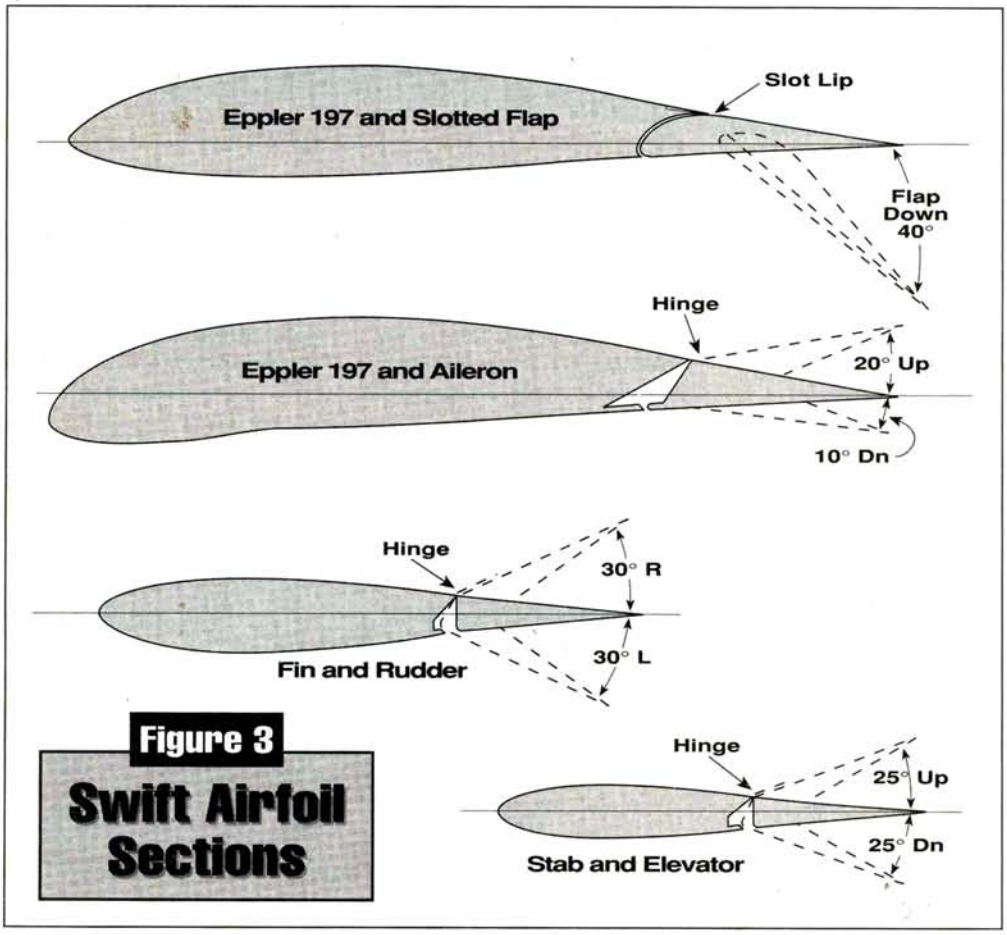


Figure 3
Swift Airfoil Sections

ENGINE/IDLE FOR LANDING

An aerodynamically clean model such as the Swift is capable of landing, *flaps down*, at air speeds in the 20 to 25mph range. It doesn't need much prop thrust to fly at very shallow angles, making landings difficult.

It's important that your engine be adjusted to its lowest, continual idle—around 2,500rpm. At anything higher, say 3,000 to 3,500rpm, it may be necessary to stop the engine in flight once the final approach has been established.

The model's structure is of stressed-skin construction. You'd enjoy flying a model such as this! Have fun!

**Here are the addresses of the companies that are mentioned in this article:*

O.S./Great Planes Model Distributors, *1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.*

APC Props; *distributed by Landing Products, P.O. Box 938, Knights Landing, CA 95645.*

Williams Bros., *181 Pawnee St., San Marcos, CA 92069.*

■

AIR FLAIR

Lectric Schtick Twin

PHOTOS BY CLYDE GEIST

Low-buck, easy-build twin

by CLYDE GEIST

CURIOSITY SEEKERS assemble behind me, yet silence prevails. I hand-launch my Lectric Schtick directly into a respectable climb, and a grin gives away my delight as I fly this unique aerobatic twin-motor model airplane. After another 5 minutes of mild aerobatics, I'll belly-land it on the grass field, prepared to answer questions. When I tell spectators that this model-airplane kit costs less than $100, including the glue, covering and motors, they want their own; heck, they can see how I like it.

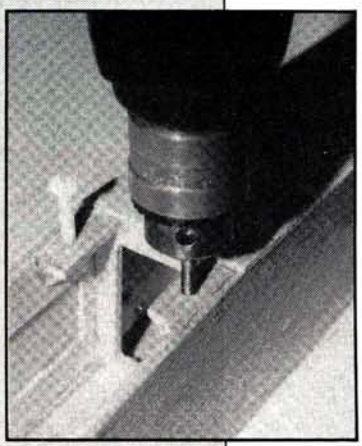
Lectric Schtick Twin

The balsa structure is very light, but it's sturdy.

SPECIFICATIONS

Model name: Lectric Schtick
Type: Sport twin
Price: $35; $80 (including motors)
Wingspan: 36 inches
Wing area: 288 square inches
Wing loading: 18 ounces per square foot
Weight: 32 to 37 ounces
Length: 29.5 inches
Channels req'd: 3 or 4 (rudder, aileron, throttle, optional rudder)
Radio used: Futaba Attack E with MCR-4A
Power req'd: .020 electric
Battery: 6 -or 7-cell Ni-Cd battery pack
Prop used: Frudenthaler 7x6-inch folding prop
Airfoil: semisymmetrical
Wing construction: all-balsa, constant-chord, rib spar
Kit construction: balsa and spruce
Features: includes all sawn parts to facilitate quick construction. The Deluxe kit's motors and gearbox provide an ideal power package. The design accepts a conventional .05 motor in its nose, or small motors in its wing.
Hits:
- economical twin-motor plane
- fast construction
- portable
- moderate aerobatic capability

Misses:
- Use of the recommended fixed props will result in broken motor mounts within a few landings. The fix is to use folding props.



You can make an effective wood tap for the wing-mounting bolts with a 10x32 headless steel bolt in a reversible drill. Harden the threads with thin CA.

Third in the Schtick series, this Lectric Schtick is the first electric plane produced by Air Flair*, and it sports twin motors at that! These folks did their homework: unlike their fuel-burning counterparts, electric twins aren't as susceptible to one-motor-out crashes; plus electric motors automatically synchronize to perfect harmony. Despite this, few electric twin kits are available, and most cost much more than the Schtick.

The Schtick's new .020 Mini Olympus motors don't draw a lot of current, even during aerobatic flight. This little sport plane with its 36-inch-wingspan appeals to nearly everyone, especially to gas fliers who may not know how practical twin power can be! Intermediate building skills and a week of spare time are all you need, then you can thrill to the subtle hum of twin motors. My compact Schtick performs just as Air Flair promised it would, but they neglected to mention one drawback: take this crowd behind me...please.

KIT CONTENTS

I was disappointed with the hand drawn plans, which appear adequate, but were apparently sketched on a budget. Economy ends here. I found consistently high quality in the nearly 100 machine-cut (not die-cut) parts, 15 of which were made of spruce or lite-ply, and all the necessary hardware was included. In fact, other than five balsa sheets, everything is fully shaped and ready to be installed by following the 10-page, step-by-step construction manual. Despite the low price, this looks like a quick, easy-to-build kit.

CONSTRUCTION

I used Zap* and Zap A Gap throughout the assembly. I quickly assembled the one-piece flat wing by attaching the ribs to the trailing edge and to the lower balsa spar. I then added the leading edge and the remaining spar.

The fully sheeted wing center section and the leading-edge strips strengthen the wing. The instructions didn't detail the aileron installation, but I used three hinges for each aileron and drilled a 1/16-inch hole in each to accept the linkage rods as shown on the plan.

- **Wing motor mounts.** I removed the motors from their housing to mark and drill 1/16-inch mounting holes in the built-up plywood mounts; 3/32-inch-thick sheet balsa holds them between the third and fourth ribs. You must snake 16-gauge wires from each motor mount to the center section before you cover the wing.
- **Fuselage.** Construction is a typical balsa sheeted box with four 3/32-inch-thick balsa doublers in the wing and hatch area. With a sharp knife, carve the Styrofoam nose block to roughly the same shape as that shown on the plan, and finish it with an 80-grit sanding block.
- **Empennage.** Instead of gluing together all three fin pieces, I hinge-mounted the back fin piece into a functional rudder (a hinge-line position is drawn on the plan). To reduce building time, the kit hinges are the type that you wick CA into, and the stabilizer and the elevator are pre-shaped.

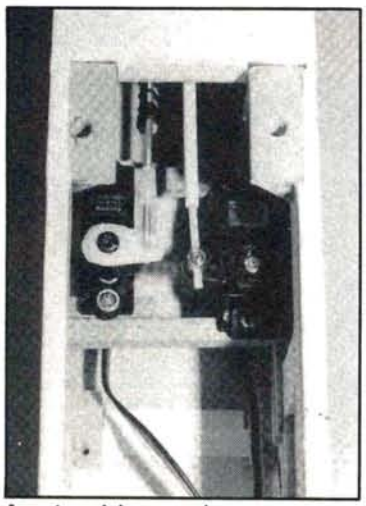
COVERING AND FINISHING

I couldn't resist trying one of MonoKote's* new pearl colors. I chose teal for the wing—the aqua-green color that's so popular on new cars—and I used white on the fuselage. AMP* graphics accent this easy-to-cover plane. The white bursts and the shadowed lettering cost about $4, and the stripes are cut from the same white MonoKote that I used on the fuselage. To finish the motor mounts, I brushed

on green enamel. It's easy, it looks great, and it's holding up fine.

RADIO INSTALLATION

The instructions for the radio installation aren't very specific. First, I attached the motor wires in parallel to a Sermos* connector in the underside center of the wing. The elevator microservo is mounted in the very back of the under-wing compartment; screws hold it to spruce cross pieces.



An extra miniservo and some spare control linkages provide optional rudder control. The elevator servo incorporates a wooden dowel control rod.

My Futaba* MCR–4A (a combination receiver/speed controller/BEC) fit snugly in the radio compartment, which is located in the nose. For the best balance, place the center of the flight pack over the front of the battery hatch and secure it with Velcro®. With this setup, my finished .020 Olympus-powered plane weighs only 36 ounces, and this includes the 1200mAh battery, the optional rudder gear and the folding props. The Lectric Schtick is a low-budget ticket to R/C twin flying!

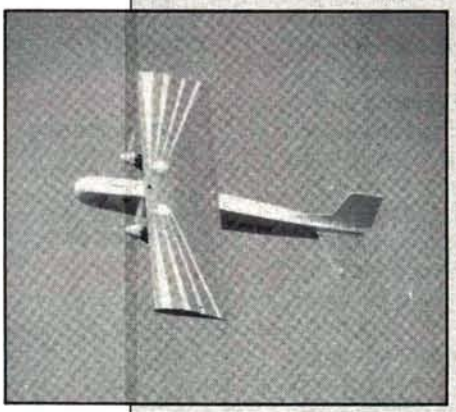
**Here are the addresses of the companies that are mentioned in this article:*
Air Flair, *P.O. Box 2075, Fairborne, OH 45324.*
Zap*; distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414.*
MonoKote/Great Planes Model Distributors*, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.*
AMP Graphics*, 36 Park St., Blue Point, NY 11715.*
Sermos R/C Snap Connectors*, Cedar Corners Stn., Box 16787, Stamford, CT 06905.*
Futaba Corp. of America*, 4 Studebaker, Irvine, CA 92718.*
SR Batteries Inc.*, P.O. Box 287, Bellport, NY 11713.*
Frudenthaler*; distributed by SR Batteries*

FLIGHT PERFORMANCE

When I tested the plane, I used Frudenthaler 7x6 folding props to avoid bending the gear shafts.

- **Takeoff and landing**

The right-hand props caused no torque problems, and the glide improved when they folded back. When the power is completely cut, the prop blades blow back under the wing where they can't unfold, so I only cut the power off during short final. The recommended fixed wooden props appear to be an economical compromise, but I broke the motor-mount supports when I used them (the supports, 1/16-inch-thick balsa sheet between the third and fourth ribs, cracked and partially separated from the wing, which was quickly repaired). This hasn't occurred with folding props. I've seen a Lectric Schtick with landing gear, which cures the fixed-prop problem. I recommend a powered landing with power cut about a second before touchdown (this can be an issue for BEC users).



- **High-speed performance**

The fastest the plane will fly with the Olympic motors is approximately 40mph, or cruising flight. I put the plane into a powered dive, and it achieved maximum speed within a few seconds (the spinning props may have braked the plane's speed).

- **Low-speed performance**

The Schtick can fly slowly with its nose elevated, but if the flight is too slow, the plane stalls violently and recovers slowly. Stalls were consistently straightforward. When my plane stalled, it took about 50 feet to recover, so guard against stalls if you're close to the ground. Dead-stick descent is fast and at a relatively high angle. It's primarily a power ship, and it should be kept in a steep glide. With fixed props, I had hardly enough speed in the glide to flare. Dead-stick duration is short, so be close to your landing point if you lose power.

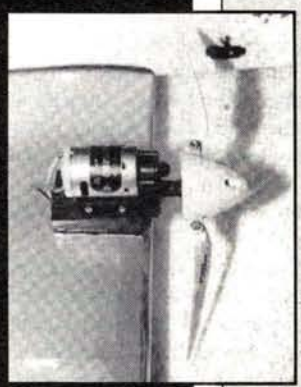
- **Aerobatics**

I originally thought that the .020 Olympic motors wouldn't provide enough power for aerobatic flight, but this wasn't the case. With Sanyo 6-cell 900mAh Ni-Cds, it loops from a slight dive; with seven of these cells, it loops from level flight. Inverted flight requires just a little down-elevator input, so rolls and split-S's are easy. Rolls are clean with very little tail wobble. The prop blast is directed onto the aileron control surfaces, and I suspect that has something to do with the plane's lively aerobatic response. The Schtick can fly for more than 4 minutes like this with a 7-cell pack—enough time to practice some novice patterns. Use of SR 1250 Magnum batteries can lighten the plane by about 1 ounce and extend flying time by approximately 1 minute. With judicious use of the throttle, longest duration flights have exceeded 10 minutes.

Plugging in the Numbers

Choosing the best electric power and prop combination is a challenge, whether your goal is a long run time or the highest attainable speed. In the December '91 issue of *Model Airplane News*, noted electric builder and flier Keith Shaw described how to choose the proper electric motors for twins. Let's see how the Lectric Schtick measures up.

A scale transport should have 40 to 50 watts per pound, and a fighter 60 to 65 watts, for good scale flight. Lets assume 50 watts per pound here. The Schtick weighs 2 1/4 pounds, so it will require 113 watts. The .020 Olympus motor will accept no more than 7 cells (8.4 volts), therefore I have to prop for 16 amps (113W÷7V=16.1A). Keith recommends a prop diameter-to-pitch ratio of as low as 1.3 to 1. In practice, the use of folding props in this diameter-to-pitch ratio is rare, but the 7x6-inch prop recommended by Air Flair comes close enough while drawing 16 amps. The 6-inch pitch at 6,500rpm will produce an approximate top speed of 39mph (6x6,500=39,000; 39,000÷1000=39). The estimated stall speed will be $3.7\times\sqrt{18}$ (wing loading ounces/square foot)=15.7mph. A level-flight top speed of twice the stall speed will provide a clean, inside loop. Looks as if I have the right props! As it turns out, the Schtick's flight performance agrees with that predicted by the numbers.



The motor and the gear are mounted under the wing. Cooling doesn't get any better than this!

QUIET FLIGHT

JOHN LUPPERGER

PROJECT 1/2A SST ELECTRIC CONVERSION

I HOPE YOU'VE decided to try the Project 1/2A SST electric conversion. My buddy Steve Shofro did it last year, and we've had a ball flying the model. It's fast and aerobatic with an Astro 6T FAI cobalt on a 7-cell 1200mAh pack. The model rolls and loops nicely, and it flies well inverted, yet the high-wing configuration is very stable. We even flew it on six cells, and that means it should work fine on seven cells and a hotter wind ferrite motor. *[Editor's note: the 1/2A SST is available from Hobby Shack* for $19.99.]*

This month, we'll build the fuselage and the tail surfaces. The really neat thing about this conversion is that you only need two pieces of wood (a 1/8x1-inch piece of balsa sheet and 1-inch trailing-edge stock) and a package of J-bolts; everything else is in the kit and requires little work. The landing gear is optional.

Start to build the fuselage according to the plans. Glue all the doublers and triangle stock into place. (I recommend Zap* and Slow Zap CA for this.) Glue bulkheads F-2 and F-3 to one side of the fuselage with Slow Zap. Use a triangle to keep the bulkheads square. Glue the other fuselage side to the bulkheads. Drill a 1/4-inch-diameter starter hole in the middle of the firewall. Glue the firewall into place with Slow Zap or epoxy. Glue the rear F-4 and F-5 bulkheads into place, and sheet the top and bottom of the fuselage according to the plan.

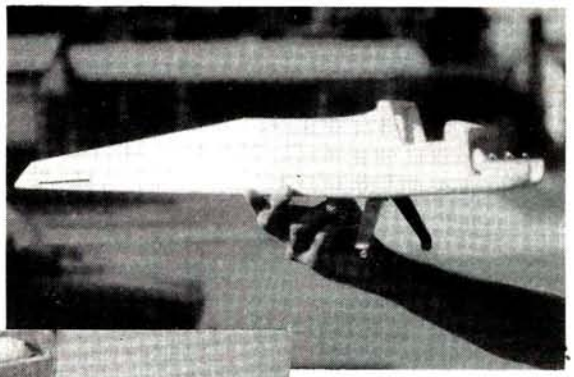
Glue the cowl cheeks, cowl bottom and triangle stock together (these parts will actually be the motor mount), and place the stock plywood motor mount on top of the cowl cheeks. Mark the bottom side of the motor mount with a pencil using the inside edge of the cowl cheeks as a guide. Cut the motor mount on these lines and use the outside parts to cap the top of the cowl cheeks.

Hold the assembled cowl/motor mount against the firewall and outline its inside profile on the firewall. Using a circular template on the firewall, draw a circle that touches the bottom and both sides of the cowl profile lines. Using a Dremel tool with a drum sander, sand the starter hole until you can fit the drum inside. Continue sanding until the hole is the same size as the circle you drew on the firewall. Test-fit your motor in the hole; widen the hole until it fits loosely. Glue the cowl assembly to the firewall with Slow Zap or epoxy. Drill through the plywood cowl-cheek caps for the J-bolts. Screw the bolts into place and position the motor with the prop adapter so that the back of your spinner will almost touch the cowl. Hold the motor in place with rubber bands and, using a 1 3/4-inch spinner (the plans recommend a 1 1/2-inch spinner, but the 1 3/4-inch works better), draw the profile of the spinner backplate on the front of the cowl assembly. Sand the front of the fuselage to match the spinner profile.

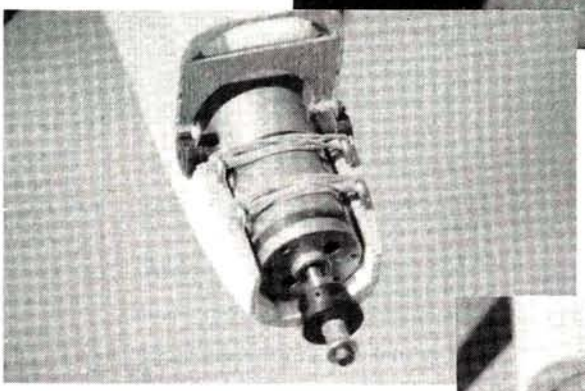
If you want to run a cobalt motor, use a Dremel tool with the sanding drum to make two cutouts for the brushes at the rear of the cowl assembly. Because the cobalt has a smaller diameter, you'll have to put it into a section of cardboard tube (like the tube inside a roll of MonoKote); you may also have to wrap it with wide masking tape to make it the same diameter as a ferrite motor. It has to fit exactly between the cowl cheeks to prevent side loads on the mount, i.e., to keep the cowl cheeks from snapping from the rubber band tension.

Glue the two tank-floor pieces together, and cut 1/2 inch off the front to allow clearance for the rear of the motor. Glue the tank floor into place according to the plan.

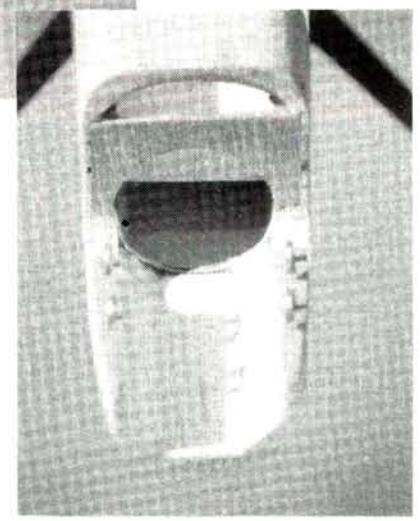
Right: Here's the framed-up fuselage with its landing gear mounted. Only use the gear if you fly off a field that doesn't allow belly landings.

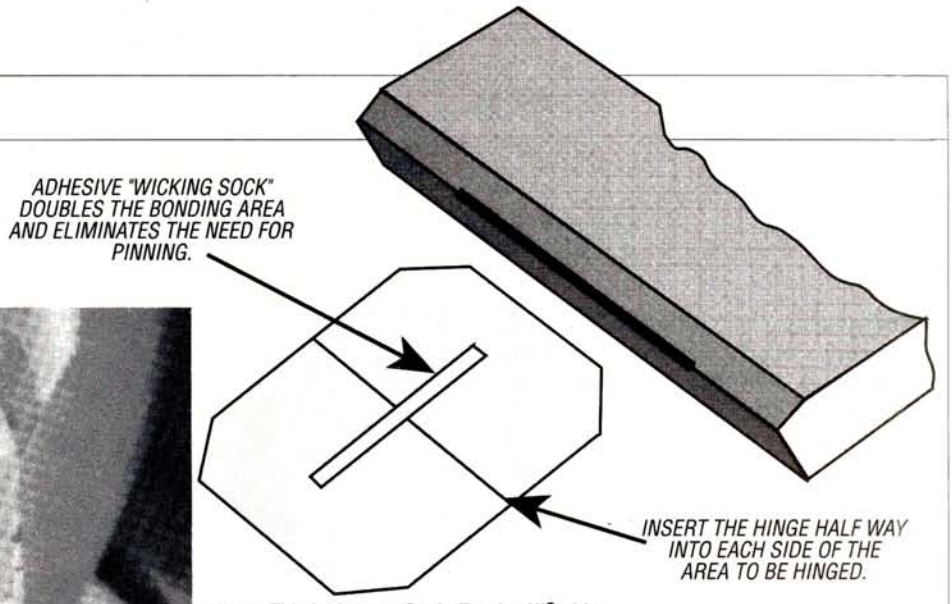


Below: The motor-mount area can accept most 7-cell motors, a 550 can, a 540 modular, or, as shown here, a cobalt .05. (You must use a cardboard sleeve with the cobalt.)



Below: The triangle stock and cowl cheeks cradle an .05 motor perfectly. A hole is drilled in the firewall for the motor to slip into, but it doesn't actually secure it. J-bolts and rubber bands hold the motor securely.





Above: This is the new Sonic-Tronics Nifty hinge. Left: The bottom of the front windshield block is shaped to form an air-intake scoop. The tank floor (visible through the hole in the firewall) is directly in line with the scoop—a perfect place to mount your ESC.

Sand the bottom of the front windshield block at an angle (from front to back) using a Dremel tool with a drum sander. Glue it to the top of the firewall and glue the top block in front of the wing saddle. Your speed controller will be mounted on the tank floor, and the scoop that the front windshield block forms will force cooling air directly over the FETs.

Assemble the vertical and horizontal stabs according to the plans. Cut two new elevator halves out of 1/8x1-inch-wide balsa sheet. (The stock 1/2-inch-wide balsa is a little too narrow when power is off for final approach.)

As you work on your SST, I'm sure you'll come to the same conclusion as I did: even though the model was designed approximately 15 years ago, it seems as though it was *meant* to be an electric. When the cowl has been assembled, it's exactly the right size for an electric motor. The tank floor is the perfect place to mount your ESC, and there's plenty of room for batteries in the fuselage.

Next month, we'll complete the construction with the wing and gear installation.

PICKING A SLOPER

A few issues ago, I talked about the kind of hill you need to go slope soaring. If you've found a suitable hill, the next thing you need is a suitable model. Your choice of model will depend on two things: your flying skills and the conditions in which you fly.

If you're a beginner, you'll need a model that will allow you to develop your flying skills, yet will contend with the conditions you'll encounter. If your hill has light-lift conditions, a basic 2-meter floater will do quite well, e.g., Bob Martin's* Pussycat and Goldberg's* Gentle Lady. These types have inherent stability and good slow-flight characteristics—features every beginner needs (whether slope soaring or thermal flying).

If the wind is a little too strong at your site for a floater, don't give up. Just build a stronger model with a broader flight envelope—a model like the Gnome 2M by Midway Model Co.* With its full F-tube wing, it's capable of carrying quite a bit of weight. With its 12.5-percent thick wing, it doesn't pick up too much speed when ballasted, yet it will penetrate well at about an 11 to 12-ounce wing loading.

If you already have some flying experience, then you might want to take a look at some aileron trainers. The two best models that come to mind are the Katie II by Bob Martin, and the Hobby Shack Ridge Runt. Both models have flat-bottom airfoils, but they suit different conditions.

The Ridge Runt is small and light, and it's suitable for light to moderate winds. The Katie II is heavier, and it requires moderate to strong winds, depending on your slope site. Another easily flown ship for low-lift conditions, but with the added advantage of aileron control, is Culpepper Models* Chuperosa, which comes in 1.5- and 2-meter versions.

In the next issue, I'll tell you how to work the available lift, and I'll give you the basics of maneuvering on the slope.

NIFTY HINGES

Sonic-Tronics* has released a new version of the popular easy-style hinge. Like most of those available, the Nifty hinge is of thin plastic and has a felt-like surface that really sticks to balsa when it's glued with thin Zap. The big difference between the Sonic-Tronics hinge and others is that a slot has been cut in its middle. This enables you to wick glue into the hinge slot, and it ensures that the glue will spread beyond the edge of the hinge. I've used them on several models (gliders and electrics) and not one has failed or come loose. Give them a try; I'm sure you'll like them.

NEW ELECTRIC GOODIES

Hobby Lobby* is at it again! Its new catalogue (no. 18) will be available by the time you see this, and it's loaded with goodies. I'll whet your appetite with a few of the hottest items.

• **Graupner Solar UHU.** It's finally here—solar-augmented flying! The Solar UHU (subject of a future review) has 20 solar-cell panels built into its wing surface. They produce 10 volts of charging power

(Continued on page 108)

GIANT STEPS

DICK PHILLIPS

THE PERFECT PRIMER - GIANT PLANS

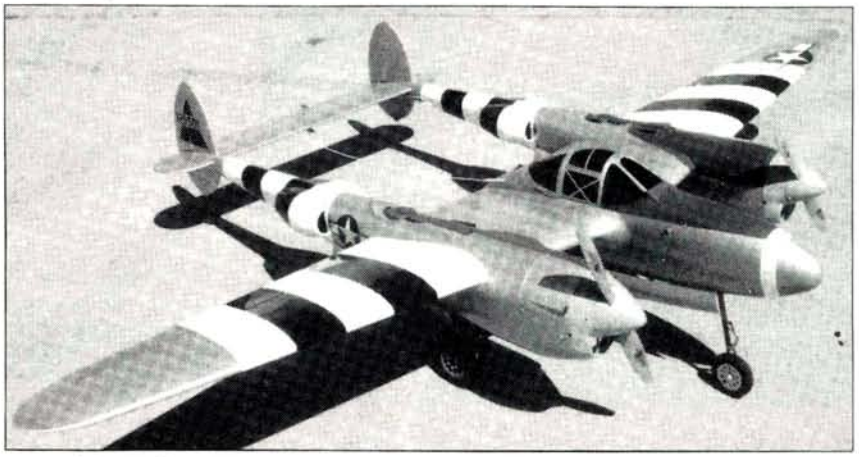
IN JANUARY'S COLUMN, I described a covering method I've developed that will enable you to produce an excellent covering job on almost any model structure. Naturally, once the covering has been completed, you'll want to color it. Getting paint to adhere to the light Dacron covering material could be a problem...it could be, that is, except for a trick from the days of silk-covered, rubber-powered models.

PRIMER

To provide a surface to which paint will stick (not just drip through the microscopic holes in the fabric), it's necessary to close the weave of the material. One of the best ways to do this is with a common baking ingredient: Knox Gelatin (any unflavored gelatin will work well). Anyone who has been around long enough has used gelatin as a sealant/primer over silk. Mix the gelatin powder according to the directions; it makes about 1 quart of clear liquid that looks and acts just like water. Brush the liquid onto the fabric just as if it were paint. What remains after the water has evaporated is a thin coat of gelatin that closes the fabric weave completely and prepares it for painting. Occasionally, the gelatin may "bead." This indicates that grease or oil has soiled the material and is preventing the gelatin solution from penetrating the fabric. Use a solvent to clean the area, and then apply a coat of gelatin. I've primed fabric with a number of primers over the years, and I haven't found anything that does as good a job as gelatin. In addition, using the gelatin adds only a minuscule amount of weight to the model—an advantage that "normal" priming materials don't have. This use of gelatin has one important restriction: you must use only *one* coat. When it's properly applied, one coat will be sufficient. Extra gelatin coats are liable to separate after the paint has been added. This could ruin your entire day.

SELECTING THE PAINT

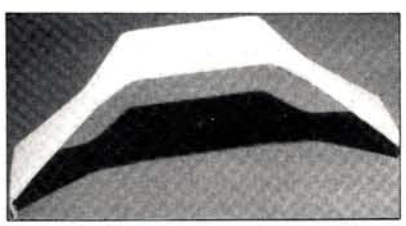
I've used a number of finishes over gelatin-treated fabric. The paint you use will depend on what you want to duplicate, of course. I've used two-solution epoxy-type paints, automotive finishes, house paint and a variety of lacquers and enamels. If you aren't sure how gelatin will work with your favorite finish, it's not a bad idea to make a test panel and try it out. I've yet to find any paint that reacts badly to the gelatin-primed fabric.



Columbia Model Works offers a new plan for this WW II, Big Iron, P-38 Lightning.

"FLEXIBILIZERS"

Painting models that contain areas of unsupported fabric requires some additional caution. If an additive is available for your paint, and it will make the cured finish more flexible, use it. The constant flexing of fabric caused by vibration and the loads placed on the structure in flight can cause cracks to appear in the paint surface. A "flexible" additive usually helps you avoid such cracks for many years. The glider-grade Dacron fabric that I use is very strong, and it's made even stronger by the addition of a good paint. There is, however, a downside to Dacron. It deteriorates over time, especially if it's exposed to light. This is why most fabric-covered full-scale airplanes are primed with aluminum paint before the colored finish is added. There's no reason why you can't do the same thing with a model; just add the aluminum coat over the gelatin primer. This increases weight, but it's isn't usually a problem with the larger models we build. Keep in mind that it's possible to build a large model that's too heavy to fly well, so govern your finishing accordingly. It's amazing how much weight an extra coat of paint will add to a model. If you doubt this, weigh your next model accurately before and after you paint it. You'll probably be surprised at how much weight has been added!



Here's the Der Jaeger landing-gear blank after I had secured the balsa fairings with Dacron (see text).

TRY IT; YOU'LL LIKE IT

For several years, I've used the covering and finishing methods I've detailed here, and I've had no reason to change my mind about them. Several modelers who have tried my methods have written to indicate their satisfaction with them as well. The next time you cover a model, give these ideas a try! I'm certain you'll be pleasantly surprised. If you don't particularly like covering models, you'll change your mind after you've tried my "sleeve" method! (See the January 1991 issue of *Model Airplane News*.)

F.E. Pierce's Stinson Model "O" has classic '30s lines.

STRUTS AND STRAPS

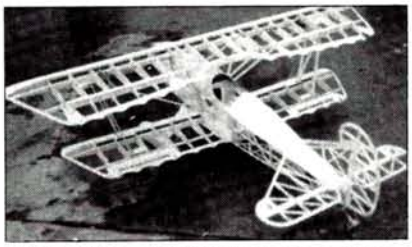
When I built my Der Jaeger, I wasn't satisfied with the usual means of attaching balsa fairings to the aluminum landing-gear blanks. I tried to glue them into place, but I anticipated that they'd come off after some use and a few hard landings. Then, I used the same Dacron that I use for covering models. This worked very well; it also works well with fairings for cabane and wing struts as well as for landing-gear fairings. Using CA, I glue a strip of Dacron of the appropriate length and width to the wooden fairing on the back of the assembly. I use as little glue as I can to cut down on the raised area that glue causes. The glue can be smoothed into the fabric to spread it out evenly. After this first glue joint has cured, I wrap the cloth around the assembly and glue it down again over the area glued first. (Making the glue joints on the back of the assembly ensures that the glue joint won't be obvious in the finished work.) The section of fabric should be a little wider than the length of the strut that you want to cover. When the fabric shrinks, its extra width will ensure that the ends of the wood have been covered properly.

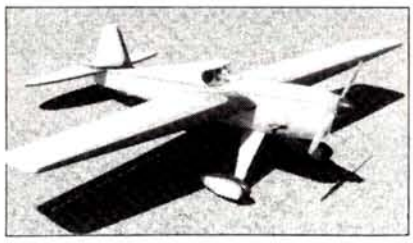
Once this second glue joint has cured, use a heat gun or a sealing iron to shrink the fabric tightly onto the fairing, affixing the wood permanently to the underlying metal assembly. If this bond ever separates, you've probably done something that will cause a number of larger problems! In a well-supported area, I like to use finishing resin over the cloth. To obtain a glass-like surface for paint, sand the resin between coats, and wet-sand the final coat or two.

NEW GIANT PLANS

Designers of model airplane plans keep cranking them out, and we've received a few more for our *Plans Directory*, Volumes 3 and 4. Three interesting, unusual plans came in recently and I thought I'd pass the news along to you.

• **P-38.** At 1/6 scale, it isn't truly giant scale, but this twin-boom WW II fighter is large enough to qualify. Its 95-inch wingspan puts it right up there with the biggies. The 70-inch-long completed model weighs between 19 and 27 pounds, and it's powered by a pair of ST 2500s. The Columbia Model Works* plan consists of five medium-size sheets and a 20-page builder's manual. This large, complex project isn't for newcomers: it requires many materials; it will take some time to complete; and it could be a handful in the air as well. It's a project for the winter (where there *is* one). The finished product looks great. If you're a WW II "Big Iron" fanatic, they don't come much more attractive than this!





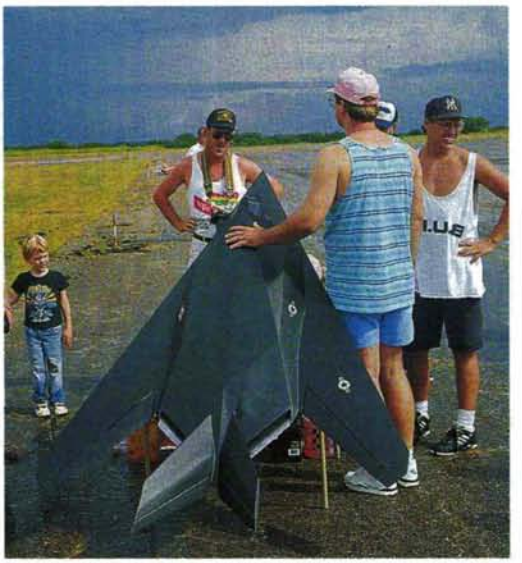
• Above: This is my Balsa USA Der Jaeger before I covered it. The "sleeve" method worked beautifully on the ABS parts. • Below: This sport model is evidence that Vailly Aviation has taken a holiday from WW II. For details about this interesting, non-scale giant, see text.

• **Stinson Model "O."** I hadn't even heard of this Stinson until F.E. Pierce's* plan arrived. If you like airplanes of the '30s, you'll like this parasol monoplane. Its classic '30s lines make an attractive model—one you won't see at every fun fly or rally in the country. Typical of the era, its round cowl has rocker-arm "bumps," spatted wheels and generous control surfaces. With a wingspan of 106 inches and a length of 70 1/2 inches, it satisfies our need for large, easy-to-see models. The three-sheet, black-line, easy-to-follow plan is very detailed. Although it uses a conventional construction method, it's moderately difficult and not for plans-building beginners. The recommended ST 3000 engine should provide more than adequate power. The model should be a stable flier and shouldn't challenge pilots who have little experience. This plane could make a good scale contender.

• **Vailly Sport.** Roy Vaillancourt of Vailly Aviation* has taken a short break from scale plans to produce this sport model. It has all the appearances of a pylon racer, but it isn't a scale model at all. It spans 88 inches, it weighs 15 to 20 pounds and it can be powered by anything from a Quadra Q35 to a Zenoah G38 to a Super Tigre 2500 or 3000. The plan for this 70-inch-long model consists of three large sheets, and the design and drafting are up to Roy's usual high standards. The construction is a little complex for beginners, but it's pretty conventional. Completing a few kits and a simple plan or two should provide the experience you'll need for this model, but it looks like a fairly hot-flying plane, so some stick time is advisable. The designer offers some accessories and a semi-kit of cut parts for the project. Obtaining them will cut building time significantly. If your aim is to go out and bore some holes in the sky with an attractive model, you could do a lot worse than the Vailly Sport.

**Here are the addresses that are pertinent to this article:*
***Columbia Model Works**, 3411 Sherwood Dr., Columbia, MO 65202.*
***F.E. Pierce**, 25260 153 SE, Kent, WA 98042.*
***Vailly Aviation**, 18 Oakdale Ave., Farmingville, NY 11738.*

MAKE ROOM GIANT-SCALERS, BIG JETS ARE ON THE WAY.



Dave Hudson's large F-117 Stealth Fighter is powered by a pair of Byro-Jet fan units. It had some problems at the meet, but it has since been flown successfully.

by RICH URAVITCH

1991 GREATER SOUTH

RETURNING TO Texas annually for the Greater Southwest Fan Fly has become somewhat of a ritual for me. It's one of those events that truly has become a fixture for the ever-growing number of ducted-fan enthusiasts around the country. Although I doubt that it will ever take on the social significance or generate the tourist appeal that a bunch of birds heading for a little town on the coast of California does, for followers of the fan, it's one of a growing number of great, all-jet, get-togethers.

I really do feel as if I've watched the growth of this event. I was at the very first one nine years ago in the little Texas town of Lockhart, and I've been to every one since. Over the years, a lot has happened and tremendous progress has been made in the field of ducted-fan jets. Things we were just "hangar flying" about at that first gathering are now realities; some things considered impossible are now not only possible, but also practical!

The George Miller YF-22 prototype is a simple structure, and the forthcoming kit is supposed to be easy to build. Under the sky conditions shown here, you can see why some of its stealthy qualities come from the paint scheme.

GROWTH IN GROWTH

If there was a trend to be recognized at the event this year, it would probably be an expansion of what was started last year. What Tom Sewell started at the 1990 event with his big (88-inch span) Lockheed T-33 has been picked up on by other modelers, and we're now starting to see what "scale" jet flying can be. Big jets like

WHEN IS A SUPER SABRE NOT AN F-100?

—when it's a Bob Violett Models F-86 kit superbly built and flown by Dick Rutkosky of Austin, TX. This is his second BVM Sabre, and it can only be regarded as more super than the first. Dick advises that he built the kit "by the book" and that he incorporated refinements developed from his first one, adding details like operating speed brakes and gun-camera lenses.

In addition, the flaps are fully functional, as are the wheel brakes, and the twin external tanks can be jettisoned in flight. The model is so well done that it doesn't blatantly jump out at you and demand "Look at me!"; rather, it's understated and invites you to notice the attention that Dick has obviously lavished on it during the building and finishing phases. It's one of those

The speed-brake area of Dick's F-86 shows the neat installation of the air cylinder that's used to extend and retract the speed brake. Note the outstanding fit of the components.

PHOTOS BY RICH URAVITCH

The "Ducked Fan" Flyers from Lubbock, TX, are a really progressive group who work collectively to get things done. They attended this event in a bazillion-foot-long motor home that became my base of operations. Who says the press works all the time at these events?!

The new T-33 T-Bird from Bob Violett Models is sure to be popular when it's released as a kit. The trend is toward larger, more scale-like-flying jets. ▼

WEST FAN FLY

Dave Hudson's F-117 Stealth Fighter with twin Byro-Jets, Mark Frankel's colorful 19-pound F4D Skyray, the Tom Sewell/Tom Cook T-33 at 20+ pounds and Bob Violett's new 80-inch T-33 in the "lightweight" category at 14½ pounds are all examples of ducted-fan models that display scale-like flying qualities using readily available, off-the-shelf propulsion packages.

There's a variety of advantages to "up-sizing" our jets: equipment and fan installations are much easier, and it can be done without the need for a shoehorn; the airplanes themselves are much easier to see and track while flying; their speeds are realistic and manageable by the average sport flier, and they won't use up two counties of airspace while setting up for maneuvers; but *most important*, they're unquestionably safer, owing to the inherent reduction in speed.

As I've said in the "Jet Blast" column in the past, as technology-demonstrators, 200mph jets are great and very impressive. Without them, we simply wouldn't have the fan units and engines that provide the reliability and performance that allow us to easily power the new wave of larger jets. These 200mph jets aren't for everyone, however, and I think the manufacturers are recognizing that fact by introducing what I'm confident will be larger

Like its finish, the performance of Ralph DiBiase's Cobra, was spectacular. DiBiase reworks the rotors of the Dynamax fan to load the engine a little more; he claims that the engine is more reliable. Combined with inlet noise, it produces a really unique sound.

Lynn Stevens prepares his big Tornado GR.1 for start-up with the help of Pat DeFilippis and George Buckingham. Balky engines prevented the wing-swinging model from flying.

Flaps are extended to landing position. All linkages are internal, and air gaps are minimal. First-class workmanship.

things that the more you look, the more you see. Though most of us would be pleased just to be able to produce such a model and stare at the fruits of our labors, Rutkosky has no qualms about taking it out regularly and flying it. With this kind of confidence, ability and talent, don't be surprised if you see him in some future Top Gun or Scale Masters competition.

The details on this model are outstanding. Even the pilot bust has been detailed to include first lieutenant bars on the shoulder. The removable hatch line is almost indistinguishable from a panel line.

The B-58 Hustler team: (from left to right) Lynn McCauley, Butch Sichels and Charlie Fondon. A project of this magnitude often requires a team effort if it is to be completed, and these three guys worked together to make it happen.

WHO ARE THE FT. WORTH HUSTLERS?

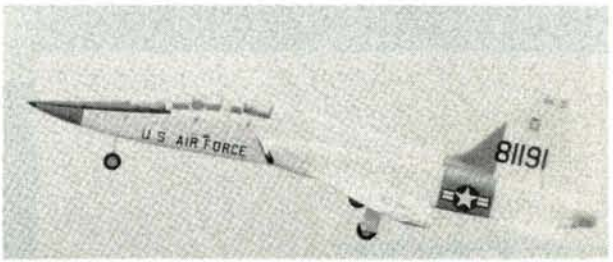
No, they're not the newest NFL franchise or the Texas equivalent of New York's Times Square work force; they're the three guys shown here with their latest effort. Lynn McCauley, who's familiar to readers of past coverage of the SWFF, is a Texan who decides on a project and then moves out. This quality has allowed him to design and build an F-84F Thunderstreak, a Stealth Fighter based on some artist's conceptions long before the public ever knew what the F-117 looked like, and a "flyable" F-104 with a scale wing. He had been considering the B-58 Hustler project for a while and had even mocked-up the scale landing gear, when another "FANatic" named Butch Sichels hooked up with him. Butch enjoys a challenge also; he spent about three years building an enormous British Concorde powered by four fans. These two guys were made for each other! With McCauley handling the design and engineering chores, Butch focused on the fabrication of the molds and the fiberglass fuselage parts and nacelles.

After the preliminary numbers had been obtained, confidence grew, and the model was assembled and displayed at the 1990 Southwest Fan Fly. Flight-dynamics data was obtained from some Convair (General Dynamics) employees, and the third member of the team, Charlie Fondon, supplied his input and got deeply involved with the project. Weeks before this year's event, McCauley "imported" fellow Texan, Bobby "Slick Sticks" Zieger from Austin to handle the test-hop chores.

Videotapes from that flight indicated an aft CG that caused the big Hustler to settle, leaf-like, onto the field when Zieger decided to abort the flight rather than continue with an aft CG. Adjustments were made, minor damage repaired, and another attempt was made. This time, the big model accelerated with authority, rotated and lifted off in a positive climb angle. Up on the step, the B-58 cruised convincingly until a turn was attempted. The model appeared to high-speed stall with the nose slicing through in yaw followed by the roll to inverted. With the model stalled, there was no place left to go but down. Having insufficient altitude for recovery, the model crashed through the trees, leaving parts and a lot of work behind it.

The 50-pound B-58 on its first flight, powered by four fan units—an incredible achievement.

After the initial response of, "That's it, never again!," Lynn's attitude has started to mellow. With the shock behind him, he now confides that he has already "started to clean up the molds and make some needed changes." Whether he builds another or not, what he has accomplished with his two buddies is nothing short of incredible. I, for one, would love to see it at the 10th anniversary gathering next year. What a fitting testament to the progress that has been made in 10 short years!



Brought by George Miller and flown by Col. Bob Thacker, this big T-38 Talon is powered by a single Byro-Jet. It flies well, despite its relatively small wing.

airframes with much broader appeal to the sport modeler—models with much less "intimidation" factor.

Even the non-scale sport jets seem to be heading in a similar direction; the "El Zulu" is a sport design by James Stevens that had a general appearance of a Tom Cook Starfire on steroids. Very clean-looking with a broad chord wing, the shape was kind of reminiscent of the EU-1 pattern ship, but with no prop in sight!

the Mid-Cities R/C Club, saw to it that all the requirements for a smooth-running event were met and that, frequency conflicts aside, all participants were allowed a maximum of flying time. The fun-fly format was once again successfully employed, with a small number of formal events incorporated into the schedule for those who chose to participate.

Because of some balky new engines, Lynn Stevens didn't fly his twin Byro-Jet-powered Panavia Tornado GR.1. This imported Italian kit comes with much of the sub-assembly work already completed, including the precision-machine, swing-wing mechanism. My guess is that the kit ain't cheap!

PASSES THROUGH THE PITS

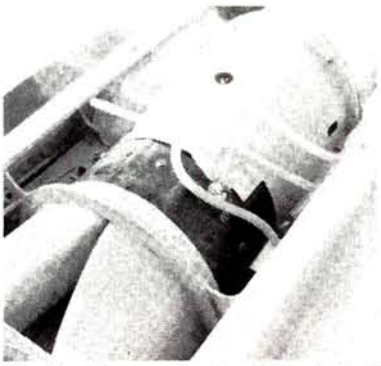
With 87 registered pilots bringing over 100 airplanes, you can bet there was a lot going on throughout the three-day event weekend. Contest Director Dawn Buckley, with the support of

The variety of subjects on hand ranged from the omnipresent Parkinson Regal Eagle and the Byron F-16 kit-built designs to the scratch-built aeronautical exotica like the Hudson F-117 and George Miller's new, "Byro-Jetted" YF-22—successful bidder for the Air Force's new Advanced Tactical Fighter contract. No one

WINNERS

AWARD	PILOT	AIRCRAFT
Tech. Achievement	Mark Frankel	F4D Skyray
Pilot's Choice	Bob Violett	T-33 T-Bird
CD's Choice	Tom Cook	T-33 T-Bird
Fastest (186mph)	Steve Korney	Cobra
Slowest (12 mph)	Bob Ruff	Jet Hawk ARF
Top Gun	Carl Spurlock	Various Byron Jets

George Miller's YF-22 at the point of touchdown. Note the large stabilator deflection. Miller believes in a simple design; the model uses conventional controls, has no inlet ducting and a minimum of bulkheads. It flew well.

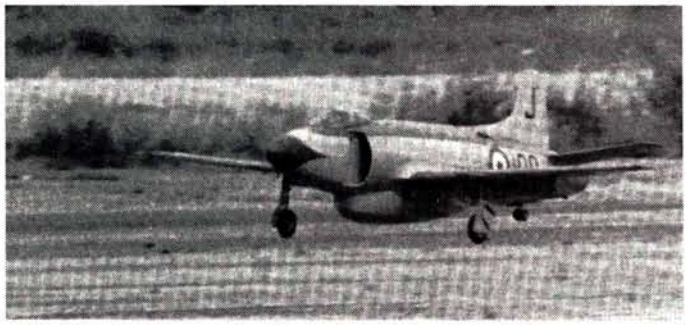


Tom Cook is now using fan airflow instead of tuned-pipe pressure to pressurize the fuel system in his T-33. Although the pressure isn't as great, it's adequate. This system allows for a neater "plumbing" arrangement, and the pressure doesn't expand the fuel tanks when the engine goes from idle to full throttle. Cook claims a more stable engine run throughout the power range.

can accuse Miller of not being timely! He told me that kit versions of his prototype will be marketed through his Custom R/C Aircraft company. The size spectrum was pretty well covered also with Harry Wood's diminutive, 2-foot, .09-powered MiG-15 opposing the 88-inch T-33 of Tom Cook. Wood tried valiantly to get the little red bird airborne, but the crosswind limited its forward motion to a rather brisk taxi pace; no doubt, under more sedate weather conditions, it would fly well.

The unsung heroes—members of the Mid-Cities R/C Club—provided all of us with some great grub and a lot of appreciated hospitality.

Ducted-fan enthusiasts are a pretty creative bunch, and they seem quite content to design and scratch-build whatever subjects suit their fancy at the moment. My guess is there are probably more scratch-builders among the fan-fan ranks than perhaps any other segment of the R/C hobby, owing to the (by comparison) smaller number of kits available from a smaller number of manufacturers. Among the modelers falling into this category is New York transplant Tim Farrell. Tim's job took him to Lubbock, TX, where he fired-up a small group of fellow modelers, whose collective efforts have resulted in some unique designs. Farrel's O.S. .65-powered MiG-21 caught my eye, almost as much as the fuselages for his single-engine Northrop F-89 Scorpion and MD F/A-18 Hornet did. He and his group are considering making semi-kits available for both these designs. Jerry Warthan is no stranger to fan activities and in past years, he could be seen blasting over the runway with his Jet Model Products F-4 Phantom. Jerry seems to have also recognized the advantages of big jets, so he showed up this year with yet another Phantom casting a larger shadow, this one scratch-built and twin Byro-Jet powered. He was plagued with engine problems, but the Rhino will be an impressive performer when he gets it sorted out.



Mike Kulczyk's Supermarine Attacker is just about to touch down—an unusual design in that it's a tail-dragger. Kulczyk competed with it at Top Gun.

FLYING FOR FUN

The relaxed, fun-fly atmosphere contributes heavily to the success of this gathering, and the nearly non-stop flying is great for participants and spectators as well. For the modeler who was just considering getting involved with fans, this was the showcase. He could see nearly every airplane/fan/engine combination he'd ever read about and compare them, asking questions of the experts who were on hand—experts like Tom Cook, Bob Violett, George Miller, Steve Korney, Bob Fiorenze, Col. Bob Thacker and Mark Frankel, along with a lot of others who were equally as experienced. To the non-modeling spectator, it was an opportunity to be impressed with R/C models in general, and specifically, jets. You could see it in their faces, judge it by their comments. They couldn't believe it!

As if all of the jet activity wasn't enough, Bob Fiorenze treated them to a demonstration of R/C helicopters! He reasoned that a rotor could be considered a fan, so he brought his machine to the event and flew it in demos. The crowd loved it!

I don't know how many jet "missions" were flown, but there was rarely a time when at least two airplanes weren't airborne. Even on Saturday afternoon, after a rainstorm had blown through the area leaving the grounds soaked and an inch of water on some parts of the runway, flying resumed at nearly its previous pace.

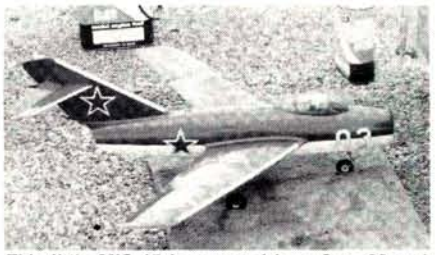
Sunday provided nearly perfect conditions and, activity-wise, it was a carbon copy of Saturday. The flight line was shut down in the early afternoon for awards presentations and to allow those who had traveled great distances, like from Canada and Florida, the opportunity to depart a little earlier.

To get this kind of takeoff performance, Don Yockey installed a Dynamax/O.S. .91 power package in his JHH F9F. Grumman uses the Navy utility scheme of blue/gray and yellow, which enhances visibility. A big, all-balsa version is coming from Nick Ziroli.

The three-day event provided something for everyone, but most of all, it created an environment in which to absorb information. Modelers who may have been having problems with their kits, fans, or engines had a host of helpful individuals from whom they could get solid answers based on experience, not hearsay. They could witness the performance, firsthand, of equipment

This large, impressive Douglas F4D Skyray was designed and built by Mark Frankel. A new, more detailed version is in the works for the Team Scale event at Top Gun '92. Frankel will team up with Tom Cook, who will do the flying.

Under the watchful eye of Col. Bob Thacker, George Miller does some final prep work on his Byro-Jetted YF-22. He says that a kit will be available shortly.



This little MiG-15 is powered by a Cox .09 and owned by Harry Woods. Its only flight attempt was thwarted by crosswinds, which were too much for the bird. Woods is an SWFF regular who always shows up with something unusual.

they may have only previously heard or read about. It's that kind of knowledge that will allow them to get into fan flying without the heartache and expense of ill-advised decisions as to which is the best way to start. So, the event was fun, informative and, hopefully, profitable for the host club. What more could we ask?

Next year's event—the 10th Annual—will return to its roots, that quiet little town of Lockhart that I mentioned at the opening of this report. It will be held in September, and the exact date should be firmed up shortly. For additional information, contact Rick Shafer, 5321 Industrial Oaks, Austin, TX 78735. See you there? I'll be the guy with no airplane and a lot of cameras hanging around my neck, having all the fun!

Richard L. Branstner

by HAL DEBOLT

R/C PIONEER EXTRAORDINAIRE

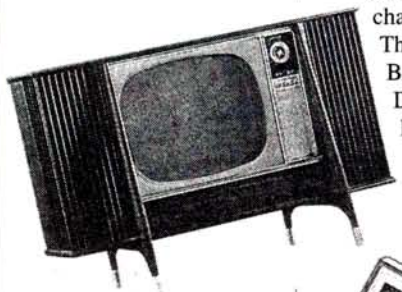
Visionary R/C pioneer Dick Branstner in a characteristic pose at an early Detroit Invitational meet.

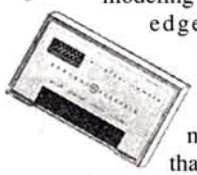
WHEN WE DESCEND into the R/C history mine, we seldom strike a "mother lode," but I found a wealth of information about one real pioneer. It would be a crime not to share this gem with you.

A TRUE PIONEER

Richard "Dick" Branstner died in 1985; at a 1990 memorial, friends and relatives gathered to remember him, and some dug deeply to recall whatever they could about his wide-ranging activities. We struck gold! There was a wealth of information and photos showing how just one man influenced *all* aspects of R/C modeling in the early days—when success for most of us meant just one flying session without a mishap! Dick Branstner Jr. provided the material that makes this story possible, so our thanks must go to him!

Modeler, visionary, imaginative entrepreneur and even dreamer, Branstner was born and raised in the Detroit "Motown" area where people of his character seem to thrive. The son of Bruno and Ann Branstner, his marriage to Donna brought two sons: Robert and Richard Jr. His innovative mind led him into modeling and, naturally, to modeling's "leading edge," which was R/C. His activities went much further than building models; he was a true R/C pioneer.





Bramco and GE offered the first TV remote control, and it led to an industry uproar. It was based on Bramco's reed system.

BRANSTNER'S BRAMCO

OT R/Cers will best remember Branstner for his Bramco operation, which produced high-quality reed systems. When he became aware of a university research project investigating resonant reed discriminators, he quickly saw how it could benefit R/C enthusiasts.

It wasn't long before he had brought together a group of knowledgeable modelers, including Ernie Kratzet (finance and materials), Eric Von Voltare (electronics), George Vaughn (sales) and a production staff, to found the Bramco Corp., which soon offered what were probably the finest multi-channel reed systems. Von Voltare was an electronics genius; his circuitry exactly met all our needs and was incredibly reliable.

Where did the university research come into the picture? It ultimately led to *stable* reed banks that didn't have to be retuned for each flight. Branstner insisted on "military spec" components for all the electronics; nothing but the very best was good enough. (Even today, we don't enjoy the luxury of "mil spec" components.) Throughout the reed era, Bramco expanded and updated its equipment until it was able to offer the first simultaneous 10-channel system, and even a first-class, single-channel system for newcomers.

If you aren't familiar with reed systems, refer to the photograph that shows the "innards" of the Bramco 10-channel transmitter. Note that before transistors, six large tubes were needed to perform the necessary functions. The two 45V "B" batteries and the large 1.5V "A" batteries provided the necessary juice—not rechargeable either! Across the top are the 10 potentiometers, which each had to be tuned to adjust the transmitter's audio tone to the matching reed in the receiver. (You had to do this then; even

"Unie"—the R/C robot car.

Dick helps Hal deBolt start a 2nd-place flight at the '57 Philly Nats.

with the finest reed systems, you didn't just move the switches!)

Bramco also offered R/C accessories, the most notable of which was the first R/C carburetor. Before that time, engines used for R/C were control-line and free-flight types without speed control. The idea for the Bramco throttle came from the English Mills Diesel, which used a similar mechanism for free-flight shutoff. With development, the Bramco throttle became the basis for *all* modern carburetors.

With the demise of reed systems, Branstner and Bramco left the model industry for a more usual industrial scene, and the company's first endeavor was with "reed switches," which are used for the remote control of machines, doors, etc. With once central control station and a single wire network, the audio-tone switches may be used to control many functions. Under another name, these reed switches are still a viable product in industry. Branstner's vision lives on!

COUCH-POTATO'S DREAM?

After this came one of Branstner's most ambitious dreams for his company, and we appreciate its results so much today. In the late '50s, if you wanted to change television channels or adjust the set, you had to do it at the receiver. To an R/Cer this seemed stupid; why not control the TV from your easy chair in the same way as you controlled your R/C model? To the visionary Branstner's mind, this was logical.

Bramco adapted its R/C technology and soon offered a small,

HOW THE EAST WAS WON

by RICHARD A. BRANSTNER

Richard Nixon and Nikita Khrushchev debate the merits of U.S. and Soviet ways of life at a 1959 exhibition in Moscow. The kitchen appliances were controlled by R/C technology developed by Dick Branstner.

In July '59, in Moscow, U.S. Vice President Richard M. Nixon had a heated debate with outspoken Soviet Premier Nikita S. Krushchev. Their discussion focused on a comparison of Soviet and U.S. technology, but they weren't in the Kremlin. At the American National Exhibition, the backdrop and catalyst of their debate was a U.S.-designed kitchen, which was loaded with the latest in high-tech Bramco R/C equipment (developed and manufactured by Dick Branstner).

The state-of-the-art kitchen had the latest labor-saving electronics. By operating a single control panel, a seated housewife could clean the floor with a radio-controlled floor cleaner and waxer, and operate the oven, stove, sink, waste disposal and mobile dishwasher. The scope of the project required input from many sources in addition to Bramco, and they included RCA and Sundberg-Ferar.

Vice president and host Nixon was taking Krushchev through the exhibition when they arrived at the model kitchen. Krushchev ridiculed it as a demonstration of "useless technology." He stated that these were merely gadgets and an example of U.S. decadence. He continued to say that America's uses of high technology for frivolous gadgets would lead to its decline and that Russia would surpass the U.S. in seven years. Nixon disagreed and said that the kitchen was a prime example of the *supremacy* of American technology and that it represented the benefits of a capitalist system.

This historic debate has been credited with beginning the period of U.S./Soviet detente—an easing of tension between the two countries. It was Nixon's first meeting with Krushchev after many years of cold war relations, and the meeting had a profound effect on the Soviets, who afterward focused their efforts on improving technology.

Though brilliant, Krushchev had little technical background or education. It was difficult for him to understand practical aspects of scientific theory, and he was actually amazed by what he saw in Moscow then. Though he admired science greatly, he also feared it, because he believed strongly that the balance of power would belong to the nations with the strongest foundations of technology.

While Krushchev decried Branstner's sophisticated application of electronics to control kitchen aids as mere "decadent gadgetry," he was much impressed by what he saw. The depth of this impression is reflected in his immediate orders to the Soviet Ministry of Information to change entirely the format of the Soviet exhibitions for the 1960 World Agricultural Fair, which was scheduled to open in New Delhi, India, the following December.

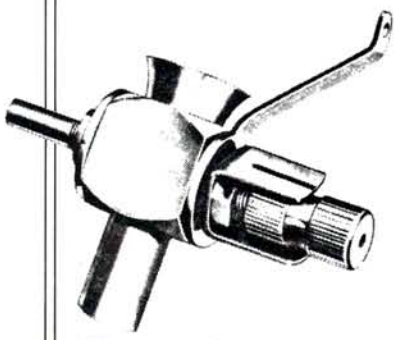
The New Delhi Fair, which was originally designed to show *agricultural* sciences, was altered to focus almost entirely on Soviet technology. The scorched hulk of Sputnick I, scarred by its fiery re-entry to the earth's atmosphere, was resurrected and displayed to call attention to the advanced level of Soviet technology. Though it had little association with agriculture, the exhibit was intended to offset the gains the U.S. had made with Branstner's stunning innovations at the U.S. kitchen in Moscow.

During the same year, Branstner continued to launch trend-setting technological innovations. Among these was the first multi-channel remote-control television unit, which was featured in *Life* magazine's September 1959 issue as "the television system of the future."

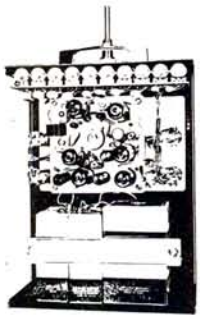
The Bramco system was a huge success; marketed by General Electric, more than 100,000 units were sold during the first year. More than 30 years later, almost every household has an updated version of the Branstner remote-control system.

Perhaps more important is that these innovations triggered an intense, but peaceful, technological competition between the two great powers. Three decades later, this competition culminated not only in the Soviet acceptance of American technical leadership, but also—and even more astonishingly—in the acceptance of democracy as the model for Russia's future.

Dick Branstner always focused his sights on his next creative challenge and never boasted about his accomplishments. I wonder whether he realized the significance of his contributions. I'm certain if my Dad were here today, he'd be both surprised and pleased.



All modern carburetors are based on the Bramco throttle, which was sold as an accessory to be used with control-line and free-flight style engines of the day.



Inside Bramco's complicated 10-channel reed transmitter. Lots of tubes, potentiometers and batteries!

Branstner's favorite giant-size Eskimo bipe at a late '50s local meet.

hand-held transmitter with push-button controls that was matched to an R/C-style receiver in the TV set. It worked like a charm! I'm sure you can imagine the initial impact of the idea, and realizing its potential, General Electric (GE) bought the idea. For about a year, Bramco produced the remote system for GE, and in 1960, GE offered the first remote-control TVs. With the exclusive rights to this desirable feature, GE TV sales soared, and this sent all the researchers in TV development labs into a frenzy. Unfortunately for Bramco, transistors were just becoming practical, and comparable remote-control devises were soon relatively easy to make. In a short time, all TV manufacturers offered less costly "remotes," and Bramco was left in the dust.

"BRANSTNER HAD NOT ONLY PROVEN THAT R/C WAS PRACTICAL, BUT HE HAD ALSO SHOWN THAT IT COULD SAVE LIVES!"

HIGH-TECH HOME

Branstner soon found another area in which to show his ingenuity. We're used to seeing talking "robots" at today's "home shows" and in movies, etc., but what might have been *the first* one was said to have been the sensation of the 52nd Annual Chicago Auto Show.

Do you remember the Chevrolet Corvair, in which the engine and rear end had been "unitized"? Collaborating with Chevrolet, Bramco remotely controlled a stripped-down Corvair named "Unie" so that it could be made to run around the show and talk to onlookers. Unie wore a top hat and had big eyes with eyelashes that "batted"—much to the delight of the crowd, especially the youngsters, who thought him cute. Dick had found another use for R/C!

If you're a family type, touring the home shows may be part of your routine. In the late '50s, GE displayed the "Kitchen of Tomorrow." Naturally, it included the very latest GE appliances, but its impact resulted from something else—a completely automatic carpet cleaner and a serving cart that automatically took food to the "woman" who sat at the table reading the paper and listening to music. While her carpet was being cleaned, the cart was bringing her lunch.

How did GE do all this? Naturally, the company turned to Branstner who suggested that operators with transmitters stand behind a two-way mirror and control the vacuum cleaner and the cart (something like today's R/C cars, but this was many years ago and with reeds).

But the path toward innovation is never smooth! Late one evening, while the show was in Buffalo, the cart malfunctioned and ran off the display and into the crowd, giving them a free dinner! There was no damage, but the show had to go on the next afternoon, and this happened late at night.

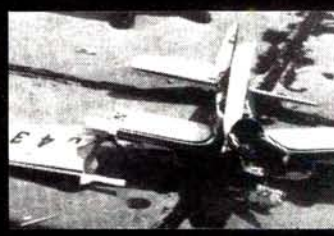
In Buffalo, I received a frantic call from Branstner: "Help! Help! Please!" We spent the whole night and the next morning delving into the mysteries of the multitude of gadgets and R/C equipment in that cart—no schematics; no instruction manual; nothing but intuition to guide us. Fortunately, the first rule of early R/C provided the solution: clean and adjust the relays; then tune the reeds and install new batteries. The matinee show went on as scheduled, and Branstner was out of a tight spot.

In retrospect, there seems to have been no limit to Branster's vision of what early R/C was capable of accomplishing. Remember the equipment shortcomings of that time. He had to be an optimist to have faith in his ideas, and it took a lot of gall to carry projects off as he did!

SUPER-SPEEDBOAT SAFETY

In the early '60s, Les Staudacher was the U.S's premier designer and builder of full-size high-speed hulls (his hulls were number-one in hydroplane racing), and while crewing for some of the Detroit-based Gold Cup teams, Branstner had met him. At that time, the world was shocked by the death of Britain's John Cobb, who died when his wooden-hull jet speedboat exploded as he attempted to beat Donald Campbell's 260mph world record. Staudacher had come to believe that hulls travelling at speeds exceeding 200mph *had* to be made of something much stronger than wood. With an eye on

ANOTHER PHOENIX HAS ARISEN?



At the memorial for Dick Branstner, we heard about something that appealed to all of us.

In the late '50s, we were flying reeds in all sorts of model configurations, *except* low-wing aircraft, which were generally agreed to be too unstable for the available control systems. Some visionaries, however, realized the potential of low wings for aerobatics, and the record shows that Fred Dunn popularized their use with the famous Astro Hog. Less well-known is that Branstner's vision led to the creation of a very modern-looking low wing, maybe even before the Astro Hog.

the world record, he contacted Alcoa Aluminum and Guy Lombardo, who eventually sponsored his world-record attempt.

In test runs, the "Tempo Alcoa" jet boat unofficially reached record speeds. Then, on an official run, the boat veered off course, but Staudacher was able to slow it enough to avoid its being completely destroyed when it struck the beach. This was a very scary incident, and it left Staudacher with bruises and great respect for what can happen when you travel at more than 200mph in a speedboat!

After reviewing the situation, they decided to rebuild the Tempo Alcoa, which had shown such great potential. But they were concerned about safety at these record speeds, and Staudacher saw it as an even bigger problem than the boat itself. To assure himself that the rebuilt hull was ready for record speeds, he drove it at speeds of up to 160mph. Then, not wanting to risk his life, he sensibly looked for some "safety insurance."

Can you guess the rest? Staudacher's needs led him to Bramco and Branstner, who said the mighty boat could be remote controlled. In a remarkably short time and with no previous experience to draw on, Bramco designed and built a guidance system and mechanics to control the Tempo Alcoa—an accomplishment that would strain even the best engineers today!

GE's "Kitchen of Tomorrow" amazed everyone with its Bramco R/C floor cleaner and serving cart.

Several satisfactory test runs were made at speeds of up to 160mph. Remote-controlling a 3-ton jet boat had proven practical! All that was left was to wait for "perfect water" and a chance to take a shot at the world record. That day soon came, and test runs showed it was time to go for it. Unfortunately, the following day's newspaper headlines read, "Staudacher boat explodes and sinks."

After two tentative passes at 160mph, they decided to go all out. Starting at one end of the lake, with Branstner at the transmitter, the Tempo accelerated past the command boat. At about 170mph, the repaired right sponson seemed to disintegrate, throwing spray and water into the engine intake. The result looked like a bomb explosion; in seconds, the Tempo had disappeared. When the wreckage had been recovered and the failure point discovered, the Tempo Alcoa was deemed a total loss.

Staudacher's afterthought tells it best: "Sure glad I didn't drive the boat past 160mph! Radio control is the only way to test these unknown regions." Branstner had not only proven that R/C was practical, but he had also shown that it could save lives! (What could be more important than that?)

The Tempo Alcoa's specs are interesting: length—32 feet; weight—5,800 pounds; power—J-35 jet engine with 5,600 pounds of thrust; two controls—rudder and throttle (rudder servo used a 3.5hp motor, the throttle, a 2.5hp). No toy, for sure!

A MODEST MODELER

Branstner's modeling wasn't at championship level; he was more of a Sunday flier type. We don't know why he didn't pursue it as vigorously as he pursued other interests, but his *choice* of models certainly showed vision. Like so many, he started with an LW Cruiser, but quickly progressed to more outstanding types, among which Kratzet's Eskimo bipe was one of his favorites; Tom McCoy's "big" Champs was another. For the Champs, Branstner's curiosity led him to develop a new symmetrical wing; after hearing about "over and under" exploits, he just had to try that inverted stuff! Probably his most outstanding achievement was a low-wing aircraft that still looks modern—a good story in its own right (see sidebar).

My association with Dick Branstner during those Bramco years was quite close; he was an inspiration to me. One episode describes our relationship best: at a Philly Nats, I was down to my last flight (probably in about 4th or 5th place; winning seemed a lost cause for that year). I just wasn't getting the performance I was accustomed to. To appreciate this, you must know that, with reeds, your plane flew itself; you just guided it and, for any maneuver, you held control on fully. Having

(Continued on page 119)

On a demo flight at the Chicago Nats, Branstner managed to do a "figure-9" into the runway—embarrassing! Seriously damaged, the remains were recovered and meticulously rebuilt by Doug Palmer—a fitting memorial.

Bramco had been asked to oversee radio operation at the '58 Chicago Nats. Branstner had been flying his low-wing airplane for some time by then, so he realized its potential. Thinking that it would make a real impact among all the high wings and bipes at the Nats, he took it along to demonstrate its capabilities. The demo flights made a real impression, but then Branstner got "carried away" and a "figure-9" into the runway badly damaged his toy.

Can you believe that, at the memorial, we discovered that Pete Waters (Kraft Midwest) had the remains of Branstner's low-wing in storage for all these years! To make a long story short, Dick Jr. prevailed on Pete for the remains, and Doug Palmer of Joe's Hobby Shop gave it his tender loving attention. Using the original type of materials, the Branstner low-wing has been completely restored; in fact, it looks as if, with the radio tuned and the original engine fired-up, we could duplicate one of Branstner's demo flights today!

As you can imagine, the Branstner family is very proud of the restoration, seeing it as a fitting memorial to the great pioneer.

ABOUT THOSE ENGINES

JOE WAGNER

THE MISUNDERSTOOD DIESEL

EXCEPT FOR THE USA and Japan, in every country where modelers fly miniature aircraft, diesel engines greatly outnumber glow types. Part of the reason lies in the scarcity and high price of both nitromethane and platinum-element glow plugs, but most of the diesel's popularity worldwide comes from its significant advantages over other types of model engine.

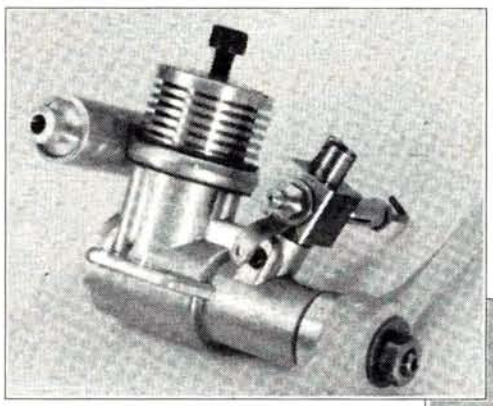
Diesels spin all sizes of propellers, using one basic fuel mixture, in every kind of climate. Their variable compression allows adjustment for almost any task a modeler would want to put his engine to. Changing the compression controls the firing point of the fuel/air mixture in essentially the same way that moving the "timer" points of a spark-ignition engine does. A big propeller needs "late" firing; spinning a small prop at maximum rpm requires an "advanced" firing point. A partial turn of the diesel's contra-piston-adjusting screw is all it takes to set the engine just right for the job you want it to do.

Beside simplicity and adaptability, model diesels have other virtues: they run much longer on each ounce of fuel than glow motors; they make a less objectionable sound; they don't rust inside; they run so coolly that they're easy to operate in enclosed cowls; and their fuel doesn't attack model finishes.

With these good points going for them, it's no wonder model diesel engines are so popular in most of the world. They should be more widely used in the USA! They would be, too, if more American modelers gave them a try and if U.S. companies manufactured them.

But diesels are different! Though an engine such as P.A.W.'s "user-friendly" ball-bearing .09 can turn the same size prop at the same rpm as, say, a Cox TD .09, it seems to do its job differently. We adjust a glow engine by ear, literally "tuning" it for maximum performance. A diesel's sound output doesn't provide such an unmistakable indication of adjustment settings.

Your sense of touch can tell you more about a model diesel than your ears can.



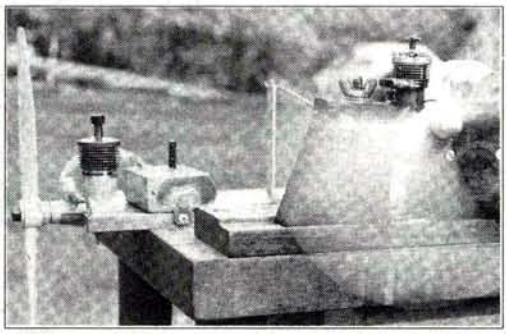
Left: The P.A.W. .09 is the smoothest running diesel I've ever owned. It has double ball-bearings and performs like a TD .09, even with an R/C throttle.

Below: The "Silver Swallow" .15, used in Chinese schools to give students hands-on aviation experience, is available in the USA from Carlson Engine Imports.

That's why hand-starting is the preferred way to get a diesel running—at least while you're learning its quirks. As you flip the prop with one hand while holding the contra-piston adjuster in the other, you can easily feel how high the compression is. If the prop is difficult to turn, back the screw off a little; if the motor won't fire, increase

STAND AND DELIVER

The easiest way to become familiar with any new model engine is to put it on a test stand. Everything's out in the open, easy to see and to reach! For model diesels, an outdoor test rig helps greatly. Few family members seem to like the aroma of diesel fuel, and the oily exhaust residue is better kept outside, too.



One end of the author's portable test stand. A modified Silver Swallow waits its turn while a 40-year-old E.D. "Bee" .06 merrily whirls a 10-4 prop at 4,100 rpm.

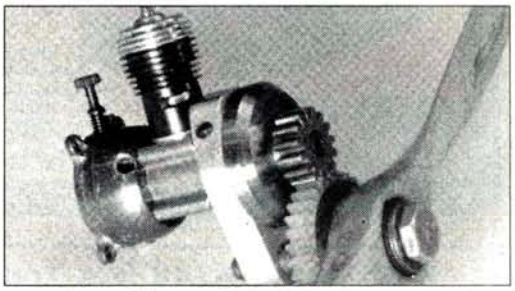
My test stand is quite simple: a 27-inch long, 2x12-inch clear pine board that's supported by four 28-inch long, screw-on legs. (I can remove these in seconds to make the stand compact enough to fit a car trunk.) Underneath, I've added a 1-foot-square plywood drawer that's 4 inches deep in which I keep tools, spare props and engines I have to break-in.

To the top of my stand, I've attached several types of mount for everything from the smallest 1/2A radial-mounted engines to 1.20ci monsters. If I have more than one engine to test or break-in, I can run five or six of them at once!

compression a little. Then, when the engine does begin to run and to warm up, back off the compression slightly to compensate for the extra heat.

The color of the exhaust oil provides an excellent clue to correct compression adjustment. It should be light brown; no darker than milk chocolate. A blackish residue indicates too much compression and extra strain on the conrod. Clear exhaust oil means the motor isn't producing all the power it's capable of.

Though no U.S. company makes model diesels these days, they're easy to obtain in America. Eric Clutton* sells the complete British P.A.W. line, from .049 all the way to .60 displacement—every size avail-



Among the 150 different model diesels Ed Carlson imports are these replicas of famous British "old-timers": two Mills (.08 and .045) and the renowned Taplin Twin .49.

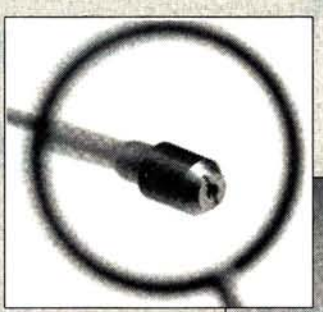
QUESTIONS & ANSWERS

I always appreciate readers' input, and I respond to every letter I receive (please include an SASE, though). I do my very best to answer all the questions thoroughly and accurately— even If it takes several pages. Sometimes, the questions are of general interest and can be answered briefly; I'll respond to such queries in "Questions and Answers." Please send your model engine queries to me at 251 Danbury Rd., Wilton, CT 06897, not to the Mount Morris, IL, subscriber office!

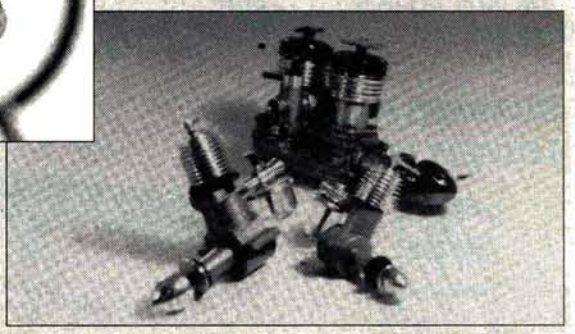
Dick Majesky of New Castle, PA, had a mysterious problem with an O.S. 1.20 2-stroke engine in a sport-pattern R/C model. The engine started very easily and ran smoothly at all throttle settings, but when he tried to fly it, the O.S. sagged out badly on takeoff. Sometimes, it even quit cold.

Dick didn't have to write in to ask my advice; I was right there at the flying field when it happened. But the O.S.'s strange behavior surely did present a question in need of an answer.

It turned out to be simple enough. The big O.S. is a thirsty engine, and Dick's airplane contained a 24-ounce fuel tank to feed it. The silicone tubing to the "clunk" weight was just a trifle too long. It didn't let the end of the clunk touch the tank's rear wall while the airplane was motionless or when it taxied, but when Dick shoved the throttle forward for takeoff, the model's acceleration stretched the fuel tubing just enough for the clunk end and the tank back to meet.



Left: The groove across the end of this clunk couldn't pass enough fuel on takeoff...
Below: Reduction gearing does work on a glow engine! This unit for the Cox Pee Wee, marketed years ago by Bob Kress, turns an 8-4 prop at 5,000rpm (engine courtesy of Nick Ziroli and Bob Kress).



Clunk ends have a cross groove to minimize this problem, but the groove isn't very wide. It may be enough to feed a .40 2-stroke, but it's definitely not enough for a 1.20 at full throttle! The fix: Dick shortened the silicone tubing 1/4 inch. I wish all model engine problems were as easy to solve!

Ted Wallace of Indianapolis, IN, writes, "Gearing down 2 or 3 to 1 lets an .05 electric motor put out plenty of power to fly a 6-foot old timer or an R/C sailplane. Yet the same motor on direct drive can hardly haul a 4-foot model up. Would the same thing be true with a geared-down glow engine?"

Yes. In fact, a few years ago, Bob Kress (the ducted-fan man) marketed a reduction-geared version of the Cox Pee Wee .020. It worked well, delivering substantially more thrust than a direct-drive prop on the same engine. However, since the unit had to be able to withstand possible crash stresses, it approximately doubled the weight of the powerplant.

Gearing down an electric motor is easy because its output torque is delivered far more smoothly than that of an internal-combustion engine. In the '50s, a friend designed a gear-drive .29 model engine that he hoped to produce in quantity, but his prototypes kept breaking gear teeth. The problem appeared to be that the same tooth on the shaft gear took the "firing" shock on every revolution. At 12,000rpm, that poor, over-stressed tooth couldn't last long before fracturing from mechanical fatigue.

Thus, because of weight and stress problems, increased manufacturing costs and the sheer added bulk required, a geared-down glow (or diesel) model engine would probably have a lot more minuses than pluses.

AIRWAVES

(Continued from page 10)

my junior high years, I can relate to those letters. It's true that kids today face more obstacles than we did when we were growing up. The nuclear family is a thing of the past. More than half of the students who enter our junior high come from one-parent homes. Because kids spend much less time with their families, videos, movies, games and friends become their entertainment. Sadly, some of these kids are lost to trouble with the law, substance abuse and other ills of society.

I'm also the science curriculum chair. Working for a progressive school district, we're always looking at ways to improve science education. Several teachers in our district have talked about incorporating an aeromodeling unit in their science class. There has even been talk of developing an after-school aeromodeling club. We plan to write a curriculum for such a course. After that has been completed, we'll formally present our plan to our school board for approval for use on a trial basis.

When we've complete the trial period, we hope to adopt the curriculum permanently. We then plan to present this program to state, regional and national conventions, and to organizations like the AMA. After several infor-

(Continued on page 78)

A Stand For All Seasons

by CLIFF & LANELL SANDS

Cliff uses the stand as he repairs the MiG.

I'VE BEEN AN airplane-watcher for 26 years, and I especially appreciate the realistic flight characteristics that the giant-scale models capture. In the air, they're graceful birds, but when the time comes to take them home, they become unwieldy crates—prime targets for hangar rash.

As my appetite for big models grew, the size of my shop shrank. I was having a space crisis. Then I remembered meeting H. L. Skates when I visited my son at Moffett Field in Mt. View, CA. Mr. Skates collects giant models, and he's quite an innovator. At the time, he was building a giant scale that was sitting on a very practical stand.

It dawned on me that a stand could be the solution to my space *and* my transportation problems. Skates's stand was made out of PVC pipe, but I couldn't recall exactly how it was built, so I decided to build my own. I went to a plumbing outlet and purchased about 60 feet of 3/4-inch-diameter, heavy-walled PVC pipe, a large array of Ts, caps, 45- and 90-degree elbows and adhesive.

GIANT-SCALE SPACE-SAVER

My expectations were high, so I took my time with the plans. I'm over 6 feet tall, so the stand had to be high enough so that I could use it without breaking my aching back, and it also had to be sturdy. I wanted it to be convertible so that I could use it with different aircraft, e.g., high-wing and mid-wing, and the top had to be removable so that the bottom would form a "cradle" that I could use to hold the plane at the workbench or to transport the plane to the field.

The stand's dimensions of 39x52x20 inches accommodates most giant-scale planes. First, make a 39x20-inch base with the PVC pipe, then assemble the legs. Each leg consists of the following pieces, used in this order: a 90-degree elbow; a 3-inch piece of PVC; a T; a 7-inch piece of PVC; a 45-degree elbow; an 8 1/2-inch piece of PVC; a T; a 7-inch piece of PVC; a 45-degree elbow; a 5-inch piece of PVC; a T; a

PARTS

36 feet of 3/4-inch PVC cut into the following sizes:
- **2 pieces of 3 feet**
- **3 pieces of 11 in.**
- **4 pieces of 18 in.**
- **4 pieces of 9 in.**
- **4 pieces of 8 1/2 in.**
- **4 pieces of 5 in.**
- **4 pieces of 3 in.**
- **12 pieces of 7 in.**

4 90-degree elbows
8 45-degree elbows
16 Ts
8 caps
5 feet of gray pipe insulation foam

1. Cut the thick-walled PVC into the lengths listed.

2. Connect the PVC as shown: 90-degree elbow; 3-inch PVC; T; 7-inch PVC; 45-degree elbow; 8 1/2-inch PVC; T; 7-inch PVC; 45-degree elbow; 5-inch PVC; T; 9-inch PVC; T; 7-inch PVC; Cap.

9-inch piece of PVC; a T; a 7-inch piece of PVC; and a cap. After you've built the four legs, join two of them at the bottom with a 3-foot section of PVC; join them again at the first T from the top, with the 11-inch PVC piece to form the back. Build the front in the same way. With a helper, hold the back and the front so that they face each other, and connect them with the 18-inch PVC pieces.

You can reinforce the cradle by installing two more Ts and some 9-inch PVC pieces to make a cross-member (optional).

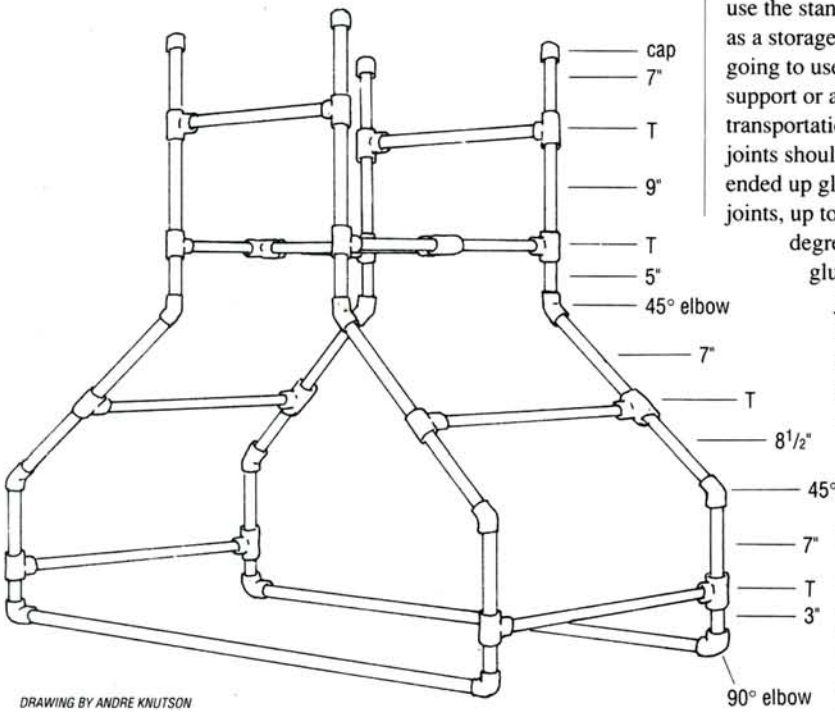
The foam pieces on the cradle are optional, but they're great for cushioning and steadying the airplane.

The floats stay clear of the gravel.

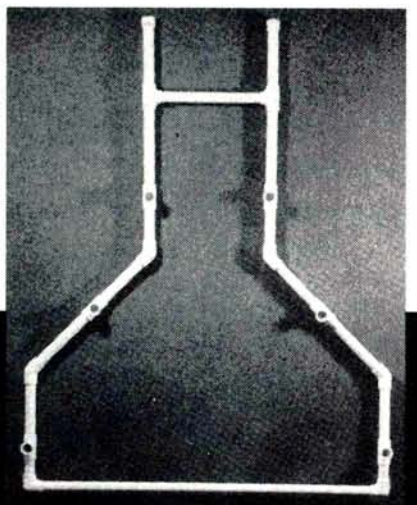
You have to decide how permanent you want your stand to be. At first, I didn't glue any of the joints. This is fine if you're just going to use the stand as a storage unit, but if you're going to use it as a building support or as a means of transportation, some of the joints should be glued. I ended up gluing the bottom joints, up to the second 45-degree elbow. I didn't glue any of the top joints, because I use the stand with different models, and I wanted to be able to adjust the stand accordingly. When I remove the top, I install four caps on the bottoms of the 5-inch legs. If I want the cradle to be taller, I replace the 5-inch legs with longer ones.

This stand is ideal for float flying. At the site, it suspends the floats above the rocks and gravel; in the shop, it provides excellent storage for wings and floats.

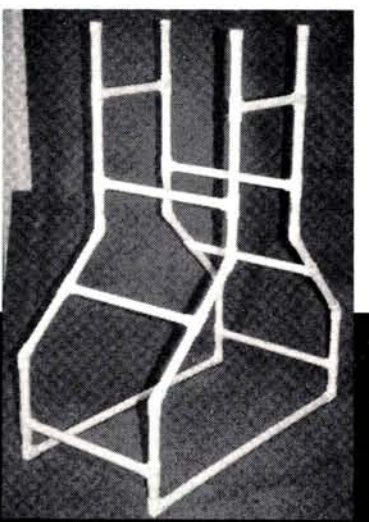
This stand certainly has alleviated my space and transportation problems, and it's a real asset in building.



DRAWING BY ANDRE KNUTSON



3. Join two of the legs using a 3-foot piece of PVC at the bottom and an 11-inch piece of PVC at the top, as shown.



4. Join the front and the back using the 18-inch pieces of PVC.

5. In the shop, the stand is a handy place to store wings and floats.

PHOTOS BY LANELL SANDS & MIKE WHEELER

AIRWAVES

(Continued from page 74)

mal chats with our school board members, I've been given the green light to proceed with the project.

Our only concern now is a budget; we don't have one. Several friends have given us old 3-channel radios. The local hobby shop has donated balsa wood, and we have a copy of the plans for a large, slow-moving trainer that would be perfect for our needs. If any readers are interested in helping, we're looking for donations of old .15 engines, and a flight simulator for Apple computers. (We hope to have a ground school for our students that will include computerized solo flights before an actual trip to the flying field.) If anyone would like to contribute to this program, please send your donations to Steve Paulson, c/o Lewiston Junior High, 914 West Main, Lewistown, MT 59457; (406) 538-5168.

STEVE PAULSON
Lewiston, MT

Steve, our recent reader survey indicated that the average age of our readers has increased in the three years since we last undertook a survey. Although we know that thousands of people enter the hobby each year, we may have an aging population of aeromodelers. We believe that aeromodeling programs in schools could refresh our ranks with younger participants. Even more important, there's a need to improve science and math education in our schools. We believe that R/C aeromodeling lends itself well to teaching a variety of science-related subjects.

R/C flying is as challenging as any video game, and it has more benefits: it's conducted outdoors; it teaches sportsmanship; and participants learn responsibility from completing an R/C kit and abiding by safety rules. Many young people have learned the basics of R/C car driving, so they're a leg up when it comes to learning how to fly R/C. Many are looking for a greater challenge in R/C recreation.

The question seems to boil down to vision and budget. I believe that many manufacturers would be willing to offer some discount for legitimate school programs that actively and productively involve students. All we need is some sort of "certified" core program on which to build. We've received several letters from teachers who have used their own equipment in school-related programs. Will high schools someday have sailplane or electric pylon racing teams? Will involved students be plotting airfoils on computers and bringing their airworthy creations to intramural competition? We hope so.

Bringing the educational and recreational benefits of aeromodeling to our junior highs

AIRWAVES

and high schools is practical and needed. Steve, we support your efforts, and the efforts of educators like you. Perhaps your program will become a model for others. We suspect some of our readers will see fit to contact you regarding donations. We'll send some aeromodeling books and magazines. Please keep us informed of your progress! TA

DOCUMENTING AN "F"

I'm drafting the plans of the Messershmit ME-109F2 and the ME-109F4 that I intend to build in 1/5 scale. Residing in Singapore, unfortunately, makes obtaining details on the aircraft difficult. Your mag has been such a great resource that I'm hoping you can put me on the right track.

BRIAN AMERASINGHE
Singapore

Brian, we offer a William Wylam three-view of a ME-109J model (see our Plans Directory, December '91)—but no F models. We looked into our reference library and found sources for the E and G models, but, alas, no F. I suggest that you try the Smithsonian Institution's Air and Space Museum, Washington, D.C. Perhaps, if any readers can sug-

(Continued on page 82)

Using Lower-Nitro Fuels

by DAVID BARON

A widely available fuel—Byron's sport premium castor/synthetic mix—was used throughout the test.

OUR TEST FINDINGS MAY SURPRISE YOU

I'M SURE THAT the shortage of nitro has affected most modelers who use glow fuel. Many are even flying less to stretch out their supply of fuel. There have Been shortages of many of the high-nitro blends, and the prices have been discouraging, to say the least. I hope that I can dispel some of the negative attitudes toward the use of fuels with reduced and zero nitro content.

High-nitro fuel is strictly an American craving. The rest of the world rarely sees high-nitro fuel, and by "high," I mean only 10 percent! The fine engines that we import are designed to function perfectly with only FAI or 5-percent-nitro fuel.

To demonstrate the viability of low-nitro fuels, a Silverline Webra* .61, an O.S.* .40 SF and a Fox* .40 were tested. The purpose of the tests was to see the effect of different nitro percentages on stock aircraft that might be found at any typical flying field. I measured both rpm and decibels (dB). All the measurements were taken at peak power levels. These tests weren't intended as a way to compare the engines with one another (the engines are obviously like apples and oranges), but rather to look for trends in total rpm and consequent noise output as a function of the percentage of the nitro used.

All engines were hard-mounted on rails in models without wings. The rpm and dB readings were taken in the middle of a large, grassy field to simulate conditions under which models are tested at fields that have sound restrictions. I used a Radio Shack (TR) dB meter set to the A-scale on fast response. The tests bring to light what to expect when you use FAI and low-nitro fuels, and the findings may enlighten and surprise you.

WHAT NITRO DOES FOR ENGINES

Nitromethane (CH_3NO_2) substantially increases the oxygen in the fuel mixture. Compared to turbo-charging and supercharging, it's a very simple way to boost performance. The supplement of oxygen yields a hotter and more thorough burn of the alcohol in the combustion chamber. This increase of heat is the greatest negative factor, and it rises proportionally with an increase in nitro content.

EFFECTS OF NITRO ON RPM

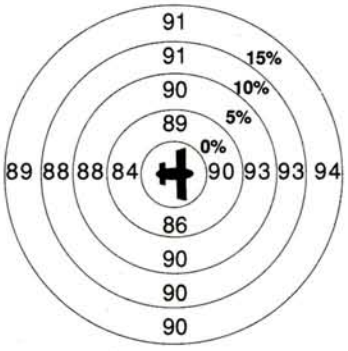
The rpm increase when you increase nitro content, but did you know that the most substantial rpm increase occurs when you use between 0 and 5 percent nitro? With FAI fuel up to 5 percent nitro, the average increase of all three engines was 577rpm! The next step up to an increase of 5- to 10-percent nitro, netted only an average increase of 100rpm. The third step up to 15-percent nitro, resulted only in an average increase of 133rpm. (See the charts for specific results.)

HOW NITRO AFFECTS NOISE AT THE FIELD

Of the three test engines, the Webra was the noisiest. This surprises me because Germany has such tough noise requirements. Their mufflers must meet their nation's 88dB noise limit. The Webra engine used in this test was equipped with the stock muffler as it's sold in this country. (Hobby Dynamics offers two other mufflers for the Webra that provide quieter performance.) As an aside for readers who are interested, I did run the Webra

TEST: EFFECT OF NITRO CONTENT ON NOISE AND RPM

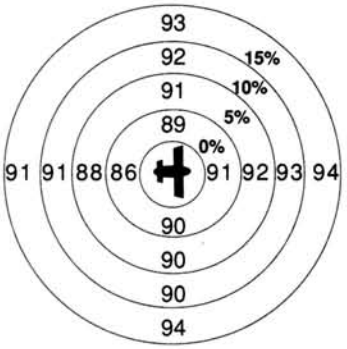
OS .40 SF



PROPELLER: TOP FLIGHT 10x6

0% NITRO ..... MAX RPM 11,500
5% NITRO ..... MAX RPM 12,000
10% NITRO ..... MAX RPM 12,100
15% NITRO ..... MAX RPM 12,200

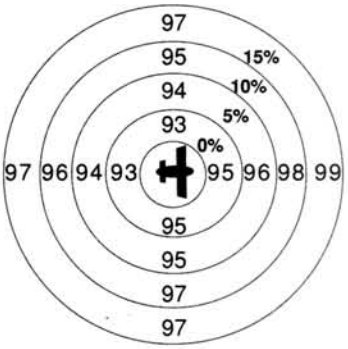
FOX .40



PROPELLER: MASTER AIRSCREW 10x6

0% NITRO ..... MAX RPM 11,420
5% NITRO ..... MAX RPM 12,400
10% NITRO..... MAX RPM 12,500
15% NITRO ..... MAX RPM 12,700

WEBRA .61



PROPELLER: MASTER AIRSCREW 12x6

0% NITRO ..... MAX RPM 11,650
5% NITRO ..... MAX RPM 11,900
10% NITRO..... MAX RPM 12,000
15% NITRO ..... MAX RPM 12,050

ALL SOUND READINGS TAKEN 10 FEET FROM AIRCRAFT. ALL SOUND READINGS ARE IN DBA. FUEL IS ALL BYRON SPORT PREMIUM, CASTOR/ SYNTHETIC MIX

with a Soundmaster* muffler, and this caused the total noise levels to decrease by 4 to 6 dBs, and it resulted in more rpm. This isn't included in my test results, because I wasn't comparing mufflers as part of this test.

Flying clubs across the nation have adopted tougher noise regulations to keep their flying sites. More than ever before, we need options to control noise. The use of reduced-nitro fuel substantially reduces noise. My findings were accurate enough to show a predictable decrease in dBs with each reduction in nitro content. When averaged out, there's a consistent 1dB reduction for each 5-percent decrease of nitro. (See the chart for the actual effects of nitro on noise.) This is primarily attributable to changes in rpm, but this means that, at the field, you can make a quick fix to reduce dB levels just by switching fuels.

BREAK-IN WITHOUT NITRO

I broke-in the O.S. .40 and the Webra .61 in the usual way without any problems, except that it took almost twice as long as expected. Both engines required approximately eight tanks of fuel to achieve the idle and acceleration needed to trust their performance.

Breaking-in the Fox .40 was more difficult. Even after eight tanks (8 ounces), it refused to hold an idle or a consistent needle setting. After another round of fuel, I broke down and fed the engine some nitro. It ran evenly after two full tanks of 10-percent-nitro fuel. Was this engine designed to cater to our lust for nitromethane? I ran the Fox again using FAI fuel and, this time, it achieved consistent performance.

There are two good reasons for the additional break-in time with low-content nitro fuel. First, FAI fuel doesn't produce as much heat as nitro. Heat is required for the piston, the ring and the sleeve to seat. Second, the engine doesn't reach the same rpm, therefore, it takes longer to achieve a complete break-in.

ABC ENGINE NOTICE

To break-in the Fox engine, I had to use nitro fuel. The Fox has a ring, and I recommend that you use fuel with a higher nitro content only to break-in engines with rings.

An ABC engine doesn't have a ring. The tolerances between its piston and its sleeve are tight, and they're controlled by the temperature of the engine. The problem is that every time an ABC engine is run with higher-nitro fuel, it's broken-in "again." When the engine is then run using lower-nitro fuel, it can't reach the same compression and is likely to deliver unsatisfactory performance. Most ABC engines can be broken-in successfully with FAI fuel because they're designed with such high tolerances between the piston and sleeve.

POINTS OF INTEREST

The test results include several points of interest:

- After break-in, all of the engines exhibited richer needle settings at peak rpm when using the FAI fuel. (I used Byron* Sport Premium fuel with a synthetic/castor mix for all the tests.)
- All the engines were very hard to hand-start when they used FAI fuel.
- The engines' glow plugs lasted substantially longer with lower-nitro fuels owing to the reduced heat in the combustion chamber.

CONCLUSION

Most of the rpm gain is achieved with the first 5-percent addition of nitro to the fuel. In every engine tested, there was an average difference of 4 dBs between fuel with 0- and 15-percent nitro, or an average 1dB increment for every 5 percent of nitro added to the fuel. This was consistent across all three mufflers each of which has a very different design.

If your club has noise regulations, and your aircraft fails the test, it's typically by only 2 or 3 dB. This makes a change of fuel an effective way to get your aircraft back into the air. Finally, if you want more rpm while using FAI fuel, then a high-quality muffler, e.g., the Soundmaster, can restore a substantial amount of the power lost as a result of the reduction of nitro content. A further noise reduction may be noticed, while achieving an rpm increase.

**Here are the addresses of the companies mentioned in this article:*
Webra, *distributed by Hobby Dynamics Distributors, P.O. Box 3726, Champaign, IL 61826.*
O.S., *distributed by Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.*
Fox Manufacturing Co., *5305 Towson Ave., Fort Smith, AR 72901.*
Soundmaster, *distributed by Davis Diesel Development Inc., Box 141, Milford, CT 06460.*
Byron Originals, *P.O. Box 279, Ida Grove, IA 51445.*

AIRWAVES

(Continued from page 79)

gest sources of scale documentation for an ME-109F2 or F4, they'll let us know, and we'll pass it on to you. GY

DREAMING OF A FUTURE IN R/C

Hi, I'm 15 years old, and I fly at the Sarasota R/C Flying Squadron Field in Sarasota, FL. I've just about finished learning to fly my Eagle 2, and I wonder what my next project should be—maybe a mild-mannered sport plane?

I started building and flying R/C early last year. I've always been interested, and I finally decided to go for it. After finding out about R/C flying at a Boy Scout meeting, I went to the local R/C club. The first person I met was Ed Picotti. I found out more about R/C, and the day after that, I was hooked. I went to the hobby shop to purchase the well-known Eagle 2.

Ed kindly offered any help he could, but he really encouraged me to learn by doing. After about two months of long nights and a lot of frustration, the plane was ready. Ed took a final look and played with the controls. Once in the air, the Eagle was simply beautiful, and I was amazed by the plane in simple

(Continued on page 89)

MODEL AIRPLANE NEWS MAGAZINE
FIELD & BENCH REVIEW

ALTECH SUPER STEARMAN

Ready-to-Cover PT-17 Aerobat

by TIM DIPERI

THE PT-17 STEARMAN was first used in the mid '30s as a full-size military training aircraft. Long after WW II had ended, the 220hp engine was replaced by a 440hp engine, and the timid trainer became the high-performance aerobatics ship known as the "Super Stearman."

Altech Marketing* certainly isn't the first to kit this magnificent bird, but its almost-ready-to-cover version contains some nice features. The entire aircraft is completely prebuilt and only requires some light assembly.

The kit includes a wooden fuselage skinned foam. The tail surfaces are of sheet construction and lightening holes have already been cut out. An ABS plastic cowl, an upper fuselage cockpit fairing, wheel pants, a tail wheel and pushrods are included. The wooden-beam engine mounts are already installed, and there's enough room for a 2- or 4 stroke engine under the cowl.

HITS:

- The kit combines the ease of assembly of an ARF with the strength of an all-wood model.
- The model looks true to scale and flies predictably.
- The model has good rough-field handling characteristics.
- It's well-made and the parts fit well.

MISSES:

- The instruction manual isn't as well-written as others I've read, but the black-and-white photos and illustrations are helpful.
- Although the instructions suggest 1 degree of negative incidence in the top wing relative to the bottom wing, a 0-degree incidence on top improved flight performance..

SPECIFICATIONS

Type: Sport biplane
Wingspan: 55 inches (both wings)
Length: 48 inches
Weight: 9 pounds, 12 ounces
Wing area: 988 square inches
Wing loading: 22.74 ounces/square foot
Power req'd.: .60 to .80 2-stroke; .70 to .90 4-stroke
No. of channels req'd.: 4 (throttle, aileron, elevator and rudder)
Sug. retail price: $229.98
Features: the model comes ready to cover. The fuselage is built up and the wings are wood-

lage that has a cockpit area and a top and bottom nose section made of ABS plastic. I don't really prefer ABS to formed wood, but this plastic is much thicker and more rugged than the plastic I've used before. The tail surfaces are ready to be hinged and glued to the fuselage.

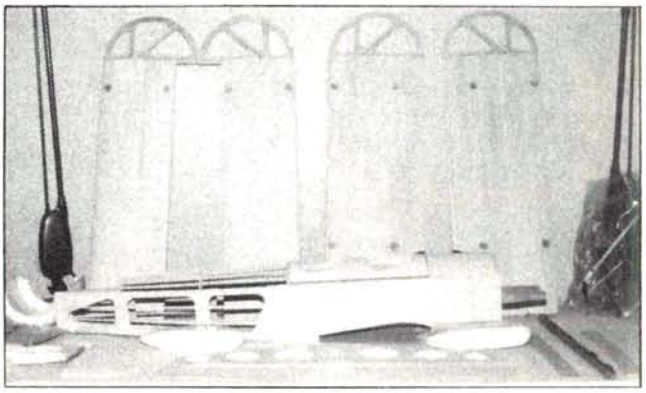
The four wing panels (two wings) are balsa-sheeted foam with a built-up section at the wingtips (for appearance). All the panels were sanded at the factory and are ready to accept the wing center spar.

Finally, there's a package containing an assortment of hardware, an instruction manual, and an ABS engine cowl and wheel pants, a tailwheel assembly and pushrod accessories.

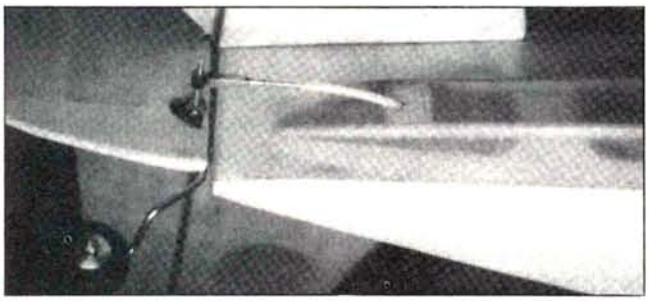
The instruction manual isn't as well-written as I'd have liked it to be, but the black-and-white photos and the illustrations were a big help.

ASSEMBLY

Because so many parts of this kit were pre-assembled, there were several ways to begin. I chose to cover the sub-components, e.g., the vertical fin and the horizontal stabilizer, first. I used Black Baron silk-spun Coverite* to get the "silk and dope" look that's clearly representative of the PT-17 era. If I had it to do again, I'd use an iron-on covering to save weight.



The kit parts as they come out of the box; good quality throughout.



This close-up shows the tail-wheel hardware and the rudder linkage installed. Note the lightening holes.

After I had covered the fuselage, I covered the vertical fin, the horizontal stabilizer and all the control surfaces.

It would probably be a little difficult for beginners to handle, but intermediate and expert pilots will really enjoy the Super Stearman's performance.

There's absolutely no work (wood-wise) necessary on the fuselage. I use Sullivan* Gold-

FLIGHT PERFORMANCE

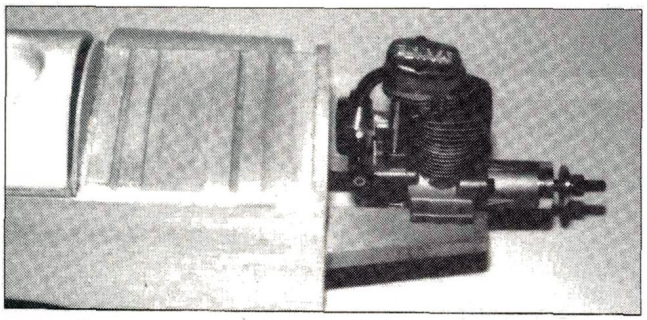
The Altech Super Stearman biplane is powered by an Enya .80 4-stroke engine spinning a 13X6 Rev-Up prop. It was test flown off two grass flying fields, both considered poorer than average.

- **Takeoff and landing**
  The model has good ground-tracking characteristics even on a rough field. At full throttle, it breaks ground in about 100 feet, and only a little right-rudder correction is needed for a straight climb-out. (This was also true in slight crosswind; rudder control is very effective.) On landing, the model is extremely stable, and even in a nose-high attitude it showed no signs of tip-stalling. The model penetrates very well for a biplane. It has a good sink rate and isn't even slightly "squirrely" at the flair. In a forward-slip approach, it loses altitude quickly—too quickly! A little rudder is needed to control the heading, and a lot of aileron is needed to keep the wings level. The model doesn't feel very predictable in the slip. During dead-stick landings, it loses altitude quickly, and turns should to be kept shallow. If the engine quits, head for the field.

- **High-speed performance**
  At full power, the wing has no tendency to tip-stall, even during premature takeoffs. Set up according to the instructions (1 degree less incidence in the top wing than the bottom) the model would tuck under rather violently with even the slightest "down" command. After talking to the people at Altech, I set both wings at the same incidence and the problem went away. Tracking is straight and smooth.

- **Low-speed performance**
  During slow-speed passes (and the plane's low-speed characteristics are surprisingly stable), the elevator feels reasonably responsive, though, as you'd expect, the ailerons definitely lose some control when approaching a stall. The rudder responds well, even at the slowest flight speeds. I discovered that the airplane would hang there, nose-up, without snap-stalling.

- **Aerobatics**
  The model rolls about 200 degrees per second and in slow rolls needs about one-eighth rudder deflection during knife-edge portions. When inverted, between a quarter and a third down-deflection was required to prevent the nose from dropping. Snap rolls are quite fast, and to end upright, control inputs are released at about 340 degrees owing to inertia. Spins are predictable and are easily stopped by neutralizing the controls. The model has no tendencies to go flat in spins. In a knife-edge attitude, the model tries to roll out owing to its wing dihedral. With the 4-stroke .80 spinning a 13x6 prop, I was unable to climb the airplane in knife-edge flight.



Wooden-beam engine mounts make installing the Enya 4-stroke a snap. The slotted hardwood blocks are for the cabane struts.

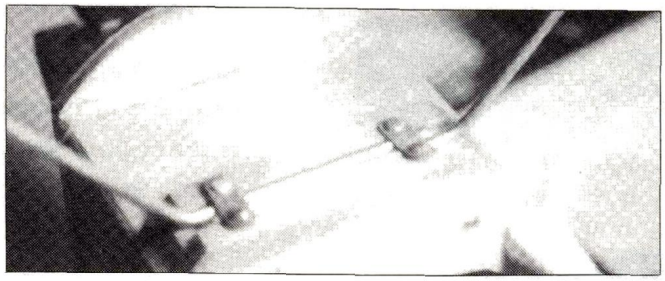
N-Rods instead of the factory-supplied pushrods; I support them in three places inside the fuselage, strengthening it with balsa near the tail where the Gold-N-Rods exit.

Before epoxying the horizontal stabilizer and vertical-fin assembly to the fuselage, I applied three coats of Sig* clear dope, sanding between every coat with 600-grit, wet-and-dry sandpaper. This is a good base to paint over, and it allows you to blend in the covering seams.

The wings are basically just as easy to do. Just wrap the 6-inch-wide fiberglass cloth around both surfaces of the top and bottom wings, and drill holes to accommodate the two positioning dowels and the two nylon bolts that affix the bottom wing. I covered both wings and painted them with three coats of clear Sig dope.

All of the ABS parts required some light sanding so that the primer would stick well. (I used light-gray automotive primer.) For color, I used Pactra's* Formula U (polyurethane) paint. Originally, I wanted to spray dope, but I was afraid that I wouldn't be able to find a matching paint for the ABS parts (dope would melt them).

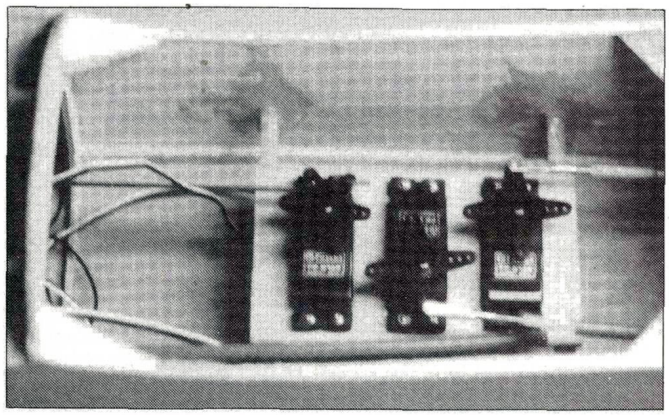
The Enya .80 is an excellent powerplant for this airplane, and its sound is outrageous.



The landing gear is mounted in a slotted hardwood block and held in place with straps.

ENGINE INSTALLATION

The powerplant is an Enya* .80 4-stroke. After I had mounted the engine on the rails, I realized just how neatly the cowl would fit. To accommodate the engine head, I only had to cut a small oval hole, approximately the size of a large egg, in it. The muffler pipe is almost totally enclosed by the cowl. This would have been a nightmare with a standard 2-stroke engine!



There's plenty of room in the fuselage for any type of radio.

RADIO INSTALLATION

I chose a Futaba* 1024 7-channel radio with S-148 servos. I didn't have to modify the kit's plywood servo tray to accommodate the servos. After I had secured the servos to the tray, I glued the tray inside the fuselage. I cut the Gold-N-Rods to the correct length and secured one to each servo/control surface.

I marked the position of the aileron servo on the lower wing and then cut the wing to accommodate it. I epoxied some hardwood rails to the wing (by the servo compartment) to elevate the servo and prevent it from bottoming out.

FINAL ASSEMBLY

After the paint had dried, there was one critical part of the assembly to be completed—the wing incidences. (See "Flight Performance" section.) This is easy to ensure with a Robart* incidence meter; the wing struts actually capture the top wing between two bolts. In 30 minutes, I had done it. I strongly recommend that, when you've achieved the correct incidence, you use Loctite* on the lower bolts so that whenever you remove the top wing, you'll be able to replace it accurately.

I was apprehensive about using a 4-stroke engine, because they aren't as powerful as 2-strokes.

To obtain the correct CG point, I added a pound of weight to the inside of the cowl. This, plus the painted-fabric finishing technique I used, brought the plane's total weight to 9 pounds, 12 ounces.

OVERVIEW

The Altech Super Stearman is a nice addition to anyone's fleet of airplanes. In ease of construction it resembles an ARF kit, but it offers the luxury of being made entirely of wood. Although the airplane is well-made and parts are designed to fit, the instructions would be difficult for beginners to follow. I also recommend that anyone who builds it pay special attention to wing incidence and CG.

The airplane has attractive lines and flies in a very scale-like manner. Like most biplanes.

**Here are the addresses of the companies mentioned in this article:*

Altech Marketing, *P.O. Box 391, Edison, NJ 08818.*

Coverite, *420 Babylon Rd., Horsham, PA 19044.*

Sullivan Products, *P.O. Box 5166, 1 North Haven St., Baltimore, MD 21224.*

Sig Mfg. Co., *401 S. Front St., Montezuma, IA 50171.*

Pactra Inc., *620 Buckbee St., Rockford, IL 61104.*

Enya Model Engines; *distributed by Altech Marketing.*

Futaba Corp. of America, *4 Studebaker, Irvine, CA 92718.*

Robart Mfg., *P.O. Box 1247, 310 North 5th St., St. Charles, IL 60174.*

Loctite Corp., *4450 Cranwood Ct., Cleveland, OH 44128.* ■

AIRWAVES

(Continued from page 82)

flight. Early on, I had engine problems. About six awesome guys jumped in to start it, and I appreciated all of this help.

After flying and attending two months of meetings, I met George Jenkins, one of your contributors. My friend Lance and I watched George majestically pilot his huge plane around the sky, and we helped him put away his equipment. In return, he gave us a bag full of model airplane magazines. Lance and I have read practically every one.

In the letters to the editor, I've read some complaints about the little things in flying. For example, one guy complained about the cost of entering the hobby. As you've explained, practically all of the hardware can be transported to the next plane. Another guy wrote in and stated that *Model Airplane News* doesn't cater at all to the beginner. I totally disagree. I read all the articles over and over, and every time, I learn something new.

I loved your Top Gun '91 issue, and I also saw a fellow club member, Corvin Miller, who flew there. Not only do the articles help a lot, but the great pictures also let me dream about my future in R/C.

My experience in R/C has been great. I've made many new friends, and I've learned many new ideas and techniques in my short time in this wonderful hobby. Everyone seems to be helpful. I'd really like to thank the people at *Model Airplane News* for their help, and I hope that the magazine will prosper for a long time. Thanks again!

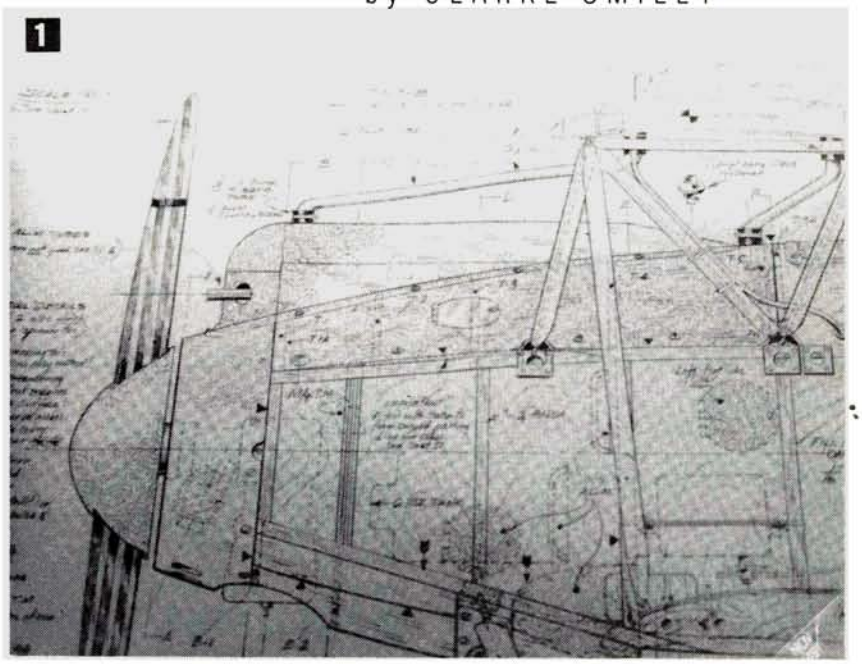
One more question: what's the highest number of channels on any R/C radio?

ADAM SCHAEFER
Sarasota, FL

(Continued on page 92)

Authentic Aluminum

by CLARKE SMILEY



1. The fairing over the top of the engine is the trademark of the Albatros D-11 (Airdrome plan). The chin fairing on the underside of the cowl is the piece shown in this article.

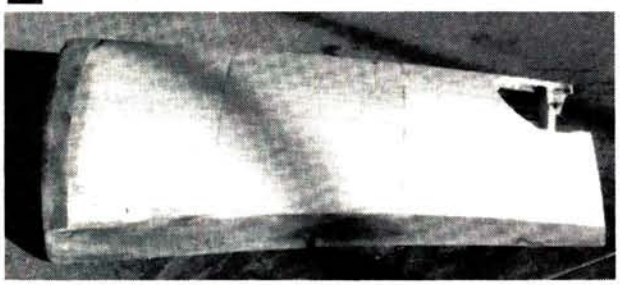
CREATE A SCALE, BURNISHED FINISH

FOR ME, ONE of the more difficult facets of scale modeling has been how to simulate round or compound-curved metal surfaces. Some WW I aircraft had many such curves, and many had tooled or burnished surfaces. Such is the case with the Austrian built Albatros D-11, a scale version of which I am now building from Airdrome* plans.

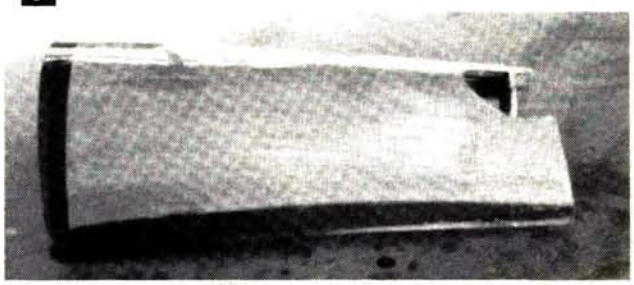
A mixture of aluminum powder (which usually comes in paste form) and clear dope can be used to simulate the appearance of these surfaces very realistically. This type of mixture is also used to "sun-proof" fabric on full-scale aircraft. Aluminum paste is available through many airports and from Aircraft Spruce & Specialty*. A little of this goes a long way.

There are a couple of things worth noting about aluminum. It oxidizes rapidly, which means it seals itself off from further oxidation. This makes it a long-lasting, protective medium. Natural aluminum panels are gray to almost white. An aluminum panel will only stay very shiny if it's polished and waxed often. The technique shown here will result in a shiny surface that makes your model look as if it has just emerged from the factory, and it will retain its finish—no polishing necessary. The pictures tell the rest of the story!

**Here are the addresses of the companies that are mentioned in this article:*
***Airdrome**, P.O. Box 1425, FDR Station, New York, NY 10150; (212) 421-1440.*
***Aircraft Spruce and Specialty Co.**, Box 424, Fullerton, CA 92632; (714) 870-7551.*
***Sig Manufacturing Co.**, 401 S. Front St., Montezuma, IA 50171; (515) 623-5154.*
***Randolph Products Co.**, 701 12th St., Carlstadt, NJ, 07072; (201) 438-3700.*

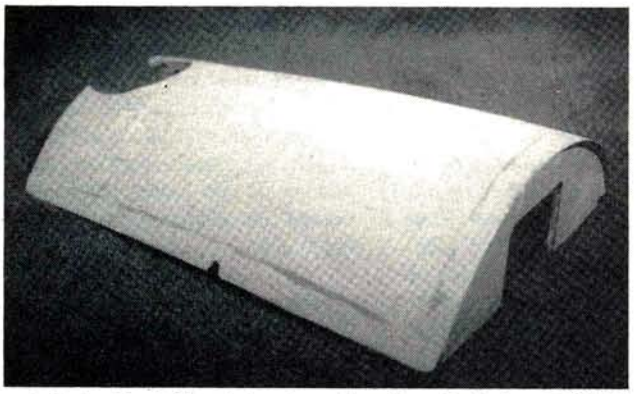


■ *2. This is the balsa-sheeted chin fairing before it had been finished.*



■ *3. First, apply three coats of Sig* Supercoat clear dope to the balsa.*

4



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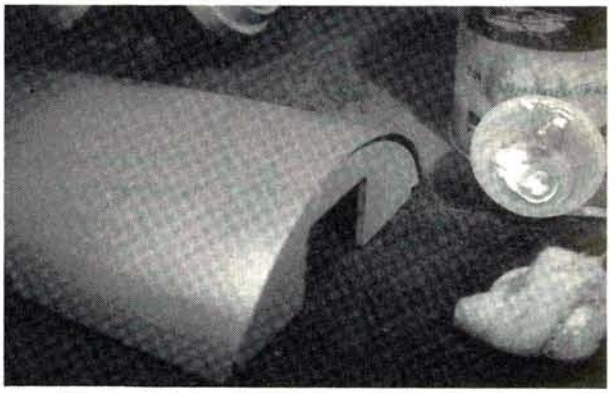
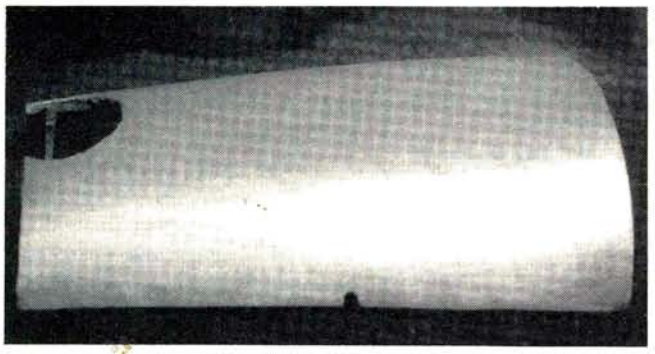


■ *4. Next, add a light coat of surface primer (I use Du Pont no. 30S). Fill nooks and dents with body putty, and sand the surface smooth. I use 400-grit wet sandpaper with water and a drop of dishwashing liquid.* ■ *5. To cover a section of this size, mix about 1/4 teaspoon of aluminum paste (Randolph* no. 701) with 1 ounce of clear dope. The photo shows the paste before I had added dope. Brush on two coats.*

6



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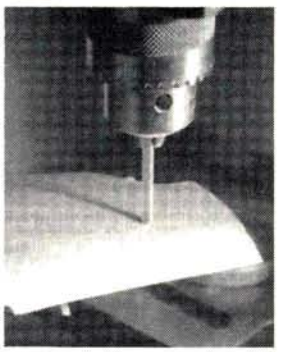
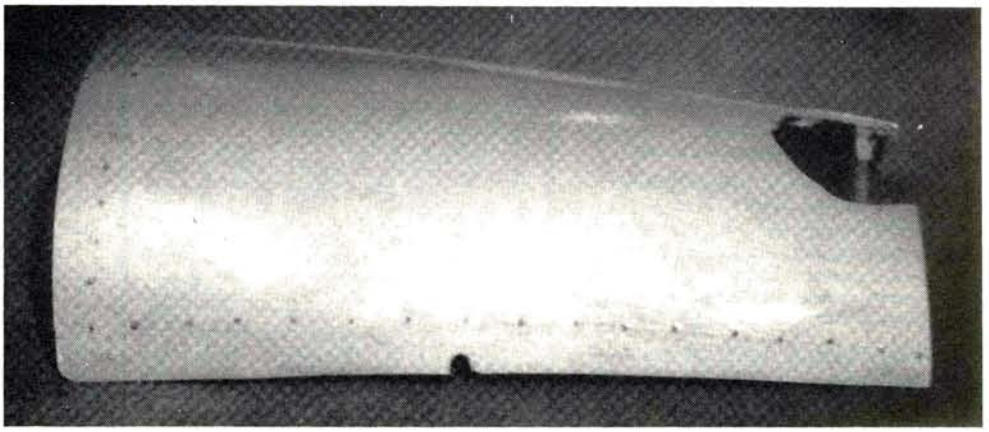


8

■ *6. After the coats of aluminum and dope have dried, apply aluminum paste directly to the fairing surface. If you use a drop of thinner on a small rag to apply the paste, it will go on like shoe polish. In the photo, you can see little swirls where the cloth was rubbed on the surface. Coat the surface twice with aluminum paste. Your workplace should be well ventilated. I recommend that you use a respirator as well.* ■ *7. Here's the enjoyable part! Mount a piece of very soft 1/8-inch-square balsa in a drill press or a Dremel tool. Keep the end of the balsa wet with thinner. (I keep a capful of thinner nearby and wet the balsa often.) The secrets here are to turn the balsa very slowly, and to use little pressure. You'll be rewarded with a very scale, random, swirling pattern. This technique can be used to create other burnished-metal patterns as well.* ■ *8. This is the fruit of my labor. Don't forget, there's burnished aluminum powder on the surface, so you must protect it. Rub the surface lightly with a soft cloth to remove any aluminum dust. If you want a dull, weathered finish, apply a coat of Sig flat dope, flat epoxy, or another flat finish.*

9



■ *9. I wanted a shiny finish, so, after adding some copper rivet heads, I sprayed two coats of Sig clear dope onto the fairing. This left a finished surface with a pleasant, random swirled appearance to which the camera can't really do justice. You'll find all sorts of uses for this aluminum paste. Example: to create different metallic sheens for metal wing panels, mask off an area on a wing, add a drop of black pigment to the paste and rub it into the surface.*

AIRWAVES

(Continued from page 89)

Thanks for the letter, Adam! There are many tried-and-true kits that could serve as the next step in your R/C career. Something along the lines of the Sig Kavalier may be just what you want. It's a shoulder-wing, aileron trainer with a relatively thick airfoil. Write to Sig, 401 S. Front St., Montezuma, IA, 50171; or call (515) 623-5154.

The radio with the most channels? The new Polk/AristoCraft Valiant 8 radio offers 50-channel capability, which is a huge leap forward in terms of available technology. From what we learned at the recent RCHTA hobby show in Chicago, it should be available in a matter of months at a list price of about $399. The 8-channel radio scans all channels when you turn it on, and it won't permit you to fly on a channel that's already in use! It also will offer mixing of any two channels.

Your comments about the help you received at the Sarasota club reflect the helpful attitude of most R/Cers when it comes to assisting newcomers. I hope others thinking about getting into the hobby will be moved by your letter to give it a try.

We were sorry to learn from a friend in the Sarasota club that Ed Picotti, a former club president, recently passed away. Our condolences to his family and to the club.

Adam, we wish you all success in the hobby! TA

WARHAWK

(Continued from page 32)

CHRIS COMMENCES

Derring-do, indeed! On flight day, it was very gusty with a 45-degree crosswind. I love 4-strokes, and I've certainly run my share of them. I have favorite engines from different manufacturers, but the 70 Surpass is my favorite single-cylinder engine out of the O.S. stable. It seems about as strong as any .80 I've run. It idled right out of the box, and it has very acceptable (though not optimal) vibration levels, which is an important consideration when looking at the engine world.

In general, Hobbico's ARF P-40E Warhawk strikes many of the modeler's fancies. Not only is it a decent reproduction of an early WW II icon of the "underdogged" and outnumbered, but it flies very, very well—a nice combination, I'm sure you'll agree. I do, however, have one "warning" for those who are considering this model. Although it's very striking in the sky and it's a "fly-it-everyday" design, you should exercise caution during high-speed low passes where tall trees are present. The plane's camouflage is definitely functional!

**Here are the addresses of the companies mentioned in this article:*
***Hobbico/Great Planes Model Distributors,** P.O. Box 4021, Champaign, IL 61824.*
***Pacer Technology and Research,** 9420 Santa Anita Ave., Rancho Cucamonga, CA 91730.*
O.S./Great Planes Model Distributors.
***Du-Bro Products,** 480 Bonner Rd., Wauconda, IL 60084.*
***Royal Products Corp.,** 790 W. Tennessee Ave., Denver, CO 80223.*
***APC,** distributed by Landing Products, P.O. Box 938, Knights Landing, CA 95645.* ■

SMALL STEPS

(Continued from page 34)

that's the club that hosts the Small Steps Fly-In each October.

A while back, we were talking about a backplate needle-valve assembly for the Black Widow-type .049 Cox engines. Such a device would allow a much bigger tank to be installed for a longer engine run. Well, one is available from Cox (see picture 3). The part number for the combination backplate and mount is 1259, and it's 1968 for the needle valve and spring. Your hobby shop will have them in stock or will order them for you.

The addition of a throttle sleeve (Ace R/C*, part no. 60160), along with the backplate mount makes the Black Widow/Golden Bee engines as versatile as the TD series.

SMALL STEPS

**Here are the addresses of the companies mentioned in this article:*
Cox Hobbies Inc., *350 W. Rincon St., Corona, CA 91720.*
Ace R/C Inc., *116 W. 19th St., P.O. Box 511C, Higginsville, MO 64037.* ■

CAD-CAT

(Continued from page 42)

at fabric stores. Tack-glue the "fuzz part" to the bottom of the fuselage at the battery-pack mark (oriented about 75 degrees off the fuselage center line.) Reinforce the fuzz strip at the bottom of the fuselage with medium fiberglass cloth and epoxy that's applied over the strip. The reason you're doing this is because glue doesn't really stick to Velcro®!

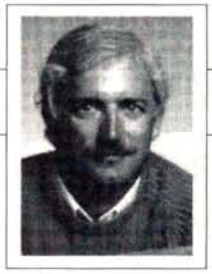
Re-insert the motor battery pack, and recheck the CG. Roll the dangling ends of the fuzzy Velcro® over the top of the battery pack, and mark the corresponding location on the top of the pack. Cut and affix pieces of the Velcro® hooks to the top of the pack using servo tape. You now have an easy to remove battery pack.

FLYING

A fairly large field should be used for the first few flights. The model is small, but fast, and it eats up a lot of space in ground effect when it

(Continued on page 96)

AEROBATICS MADE EASY



DAVE PATRICK

THROWS AND SERVO LINKAGE

THE OBJECT OF this new column is to provide helpful hints and advice that will improve your flying skills, educate you about your equipment setup and, most important, enhance the fun you'll have at the flying field.

Like most of you, I love to fly. Though my area of expertise is aerobatics, particularly pattern (F3A), once in a while I like to let my hair down to "hot dog," or fly helicopters, or race. I've found that proficiency and skill in one discipline can help greatly in another. For example, learning how to do a precise four-point roll at will makes it relatively easy to show off and do a nice four-point off the deck; learning to fly with rudder is a great help if you want to fly helicopters. I'd like to begin with two very important topics.

THROWS AND SERVO LINKAGE

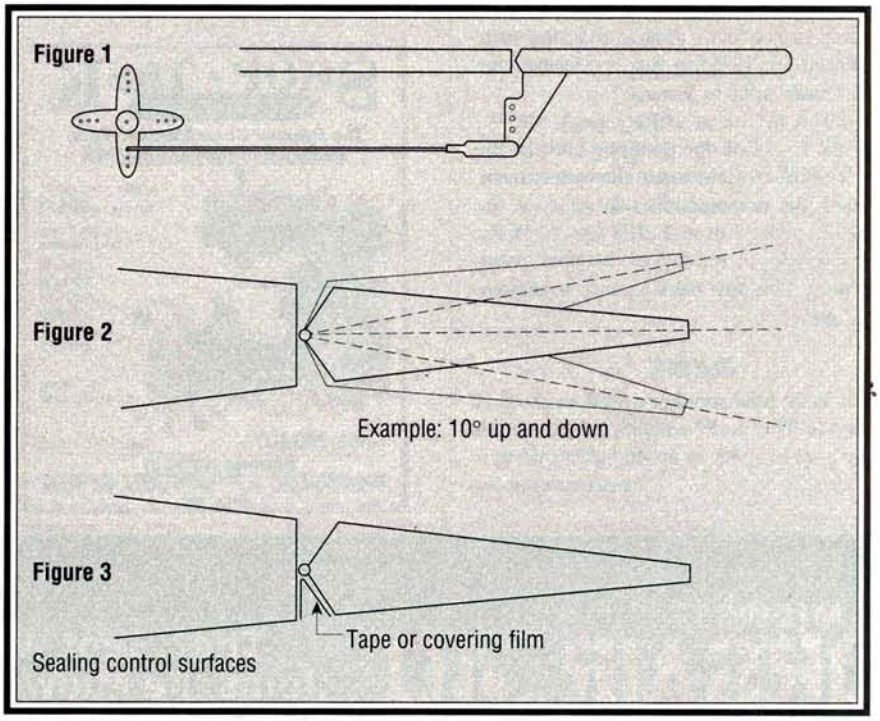
Have you ever seen a skilled pilot who couldn't fly a good plane smoothly—or even in a straight line—because of a set-up problem? After he makes a few adjustments, however, there's an immediate, magical transformation. With this in mind, let's review some very important setup tips. First, your radio must work precisely and smoothly. You don't need to spend big bucks here for a good control system, but whenever you move the control stick even slightly, the servo must respond properly and return to its exact center. If it doesn't, change servos, or send your system in for service. This could save you a lot of grief and time.

LINKAGES

At the control surface, always use control horns that are as long as is practical. This frequently overlooked point is often the culprit behind trimming and sometimes, even flutter difficulties. Using a long control horn reduces mechanical slop, and there's less chance of flutter because of greater leverage (Figure 1).

And, of course, when you glue in those little hinges, there isn't any binding, right? Only a little, you say? Wrong! Like you, I hate hinging, but hinges must move smoothly and freely—believe me, it makes a real difference to all planes.

With those rules behind us, let's move on to more enjoyable stuff, e.g., how much throw is enough? Many modelers tend to set up with too much throw, and reason that a little extra will help prevent trouble. Those planes never fly smoothly. They can't; they're too sensitive! (Dual rates or exponential isn't necessarily the correct fix. We'll discuss how to set those up in a future article).



THROWS

Degrees of deflection is a good place to start because you can use this as a starting point for most planes (Figure 2).

Elevator: 8 to 10 degrees up and down. You need less elevator as you move the center of gravity (CG) back, and you need a little more down than up for a balanced feel.

Ailerons: 6 to 8 degrees up and down. Try to achieve equal aileron deflection in both directions. (I'll examine differential in another column.)

Rudder: 18 to 25 degrees left and right—sometimes more, but never more than 35 degrees. If 25 degrees isn't enough, consider adding rudder area; deflection angles over 30 degrees just add drag.

I measure in degrees, because it's independent of how wide the control surfaces are.

You want barely enough throw to make the plane accomplish your objectives. If you want your plane to spin, putting in more throw than it takes to spin the aircraft will make smooth, level flight more difficult. If you reduce deflection so that your plane just barely spins, it will fly much more smoothly in straight and level flight.

(Continued on page 117)

CAD-CAT

(Continued from page 93)

lands. Of course, grass is the preferred medium. Smaller fields can be used as you become more experienced.

Check control directions and CG once more. Check that the motor turns on and off by the throttle stick. Charge all batteries fully. My safety procedure is to only connect a charged motor battery to the motor controller just before flying. Once connected, I consider the aircraft "armed" as in "bomb"! That means no one is allowed to stand in the prop arc or touch the prop, whether the receiver battery and transmitter are on or not. The same precautions are taken after flying until the "bomb is disarmed." This may be overkill for seven cells, but it makes a lot of sense with 27 cells and folding props!

Have a buddy hold the Cad-Cat by the CG at shoulder height, and launch it into the wind. A level straight throw is required. A Nolan Ryan fast ball isn't necessary, nor is a curve ball. The model will accelerate during the first few hundred feet. Don't honk back on the elevator until speed has built up; then execute a

climbing turn to a safer altitude, feel it out, set the trims, etc. You'll find that even with only a right aileron, it makes fine left turns, but be careful on the right turns as the nose will drop. It also loops and rolls.

You're now the proud owner of a world-class, 7-cell electric pylon racer. If enough people become interested, clubs will begin to organize races, and electric pylon will become as popular as other sport-type classes springing up around the country. Each club could field a team and compete for a place on future U.S. FAI F3E (soon to be F5B for electric pylon) teams that are competing in Pylon World Championships (when this comes into being). I'm dreaming now, but it could be the sign of the times. The advantage of electrics is, of course, reduced noise and smaller field requirements. Most high-school ball fields are acceptable contest sites. In San Diego, we've flown electric models at several established model fields, a few modest-size school yards and one fairly large city park. Want to race?

**Here are the addresses of the companies mentioned in this article:*
AstroFlight Inc., *13311 Beach Ave., Marina Del Rey, CA 90292.*
Leisure Electronics, *22971 B Triton Way, Laguna Hills, CA 92653.*
Graupner; *distributed by Hobby Lobby International, Inc., 5614 Franklin Pike Circle, Brentwood, TN 37027.*

(Continued on page 108)

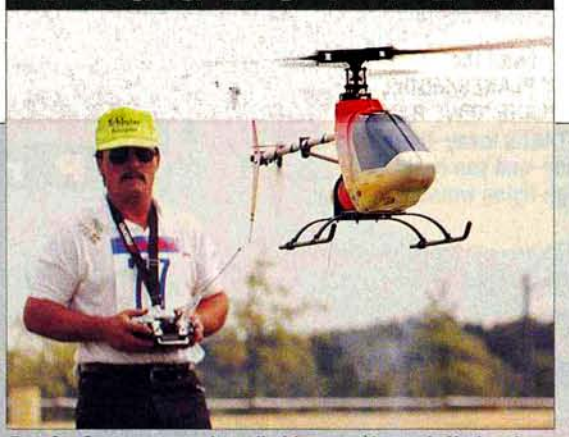
Schluter Cup 1991

by A.E. STANLEY, JR.

Wayne Mann's beautiful Triumphs have X-Cell Mechanics.

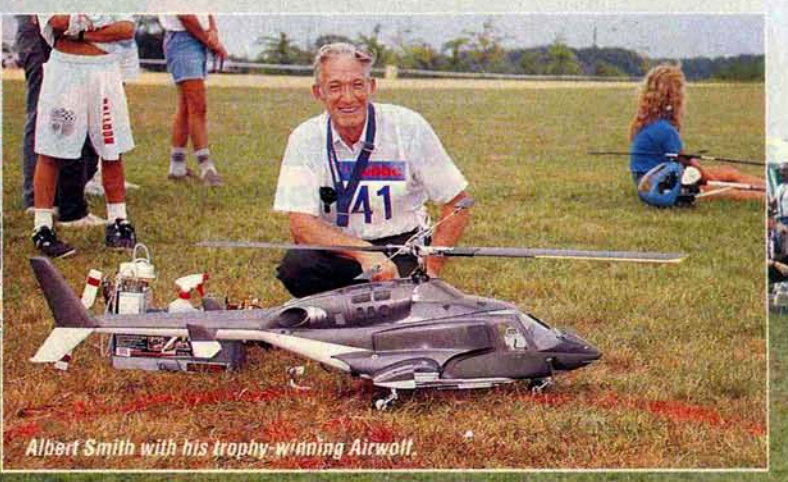
THE 1991 SCHLUTER Cup had the most participants in the event's history. Not only was this the Schluter Cup '91, but 91 was also the number of contestants entered in the four classes of competition. That's a lot of pilots at one meet! A rough count put 204 helicopters at the site. Try to figure *that* out in dollars and cents. The event was held on September 14 and 15 at the Mercer County Park in West Windsor, NJ, and it was sponsored by Robbe/Schluter of Belle Meade, NJ.

BIGGEST YET!



Ray St. Onge gets ready to fly his second round. He has been flying switchless inverted, backwards, sideways and every other way for years. Now he's flying FAI. The guys at the top should worry about this man.

The Schluter Cup is fast becoming a "must-attend" meet for the top guns of FAI competition. Most of the big names were there, including Wayne Mann, Mike Mas, Dwight Shilling and Cliff Hiatt. A total of 20 fliers entered the FAI class, and Mann's flawless flying once again captured him the top spot. In fact, his score was 19.5 points higher than that of 2nd-place flier Stan Olzaski. Wayne's *low* score (317.5) would have given him 1st-place honors! The battle for 3rd was hot enough to force a fly-off between Mas and Shilling, who tied with 307 points each at the end of regulation flying. Mas prevailed and walked away with 3rd place.



Albert Smith with his trophy-winning Airwolf.

There were 26 competitors in the Intermediate class and a whopping 37 contestants in the Novice class. The Novice flight line buzzed all day, just to get everyone through one round. Some of the guys looked pretty good. With numbers like this in Intermediate and Novice, there should be an even bigger turnout in FAI within a couple of years. There were even eight machines entered in the Scale competition. That's six more than made it to the Nats!

With 91 contestants, there was a lot of flying to cram into two days. Unfortunately, there was only one flight line, and it was shared by FAI, Intermediate and Scale. This allowed each class one round of competition on each day. Plans are already in the works for another site that will allow two flight lines for next year's event. The West Windsor Flying Club hosted a very well-run event, and there didn't seem to be problems with any phase of the competition. The credit for this goes to Contest Director Bruce Weeden and his staff. They made the event great for contestants and spectators alike.

Mark Garner and his Ecureuil.

Not all the action was out on the field; things were busy in the pits, too. Hobby Dynamics was on hand with some of its team fliers, as well as field representative Cary Woolard. They had some of the neatest machines there. Cary brought a little Whisper clad with the new Augusta 109 fuselage. This little wonder really gets up and moves. In fact, it even performed a loop. Amazing! The Kalt guys also had a really slick travel box for Hiatt's new Epsilon with Baron Alpha II mechan

W I N N E R S

	CLASS	POINTS	HELICOPTER	RADIO
	FAI			
1	Wayne Mann	329.5	X-Cell .60	Futaba
2	Stan Olzaski	310.0	Concept .60	Futaba
3	Mike Mas	307.0+	Hirobo Condor	JR & Futaba
4	Dwight Shilling	307.0-	Concept .60	Futaba 1024 9UHP
	NOVICE			
1	Mark Potts	560.0	Schluter Magic	Futaba 1024 9UHP
2	William Comerford	551.0	X-Cell .60	Futaba 1024 9UHP
3	Kent Gabrys	520.0	Schluter Champion	JR
4	Bob Young	515.0	X-Cell .60	JR
	INTERMEDIATE			
1	Richard Bell	411.0	Schluter Scout	JR
2	Thomas McAteer	399.0	X-Cell .60	JR
3	Arne Ernits	397.0	X-Cell .60	JR
4	Ed DeRossi	392.0	X-Cell .60	JR
	SCALE			
1	Albert Smith	2709.0	Airwolf	Airtronics 7HI
2	Dale Hart	2536.0	Schluter Long Ranger	Futaba
3	Tim Diperi	2302.0	Hirobo Jet Ranger	Futaba 1024 9UHP
4	Ken Donnelly	2301.0	Schluter Jr. 50 (Bell 222 body)	Futaba

PHOTOS BY A.E STANLEY, JR.

▲ *Smith flew his Airwolf well enough to win 1st place in Scale. It means a lot when you consider the time and the work that goes into a machine like this. Nice job, Al!*

◀ *When you've finished with your hair, try a little mousse on your heli!*

Schluter Cup 1991

Cliff Hiatt packs up his Epsilon for the trip home—nice travel box!

SCHLUTER CUP '91 SPONSORS

PRIMARY SPONSOR
Robbe Model Sport

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SR Batteries
Sween ID Products
S&W Fuel
Webra

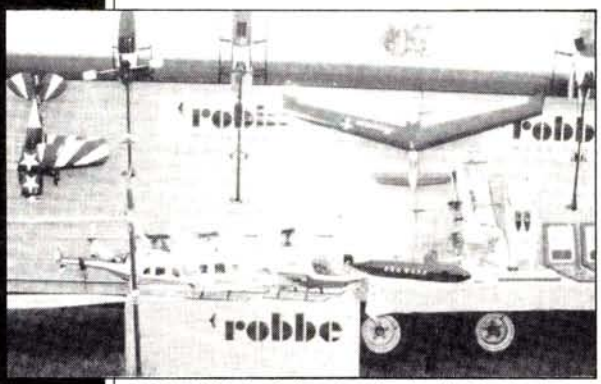
Notice the fuel tank pressure line. The T-fitting allows pressure into the fuel tank from the header and the muffler.

ics. It's small enough to rate as a piece of luggage on all major airlines.

Some Canadians at the Kalt booth had a novel idea. It seems that you can assemble a piece of tail boom, a couple of silicone connectors, a small piece of skid and a mousse can to make a tuned pipe. They said that only Canadian mousse cans will work, but give the American brands a try.

The big manufacturers were all well represented in the flight competitions. The new Miniature Aircraft Triumph was convincingly flown to 1st place by Mann and to 7th place by Ted Schoonard. The new kid on the block, the Concept .60, was truly impressive with 2nd-, 4th-, and 5th-place finishes (flown by Olzaski, Shilling and Peter Cooke, respectively). There was a lot of talk among the pilots in the pits about the Concept .60; with stats such as this, it can't be ignored.

Robbe/Schluter presented plaques to the top four finishers in every class, and they provided a wide selection of parts and supplies for a contestants' raffle. There were also raffles for a Scout .60, a Futaba Super 7 radio, a Futaba gyro and a Webra engine. One lucky guy (who bought many tickets) walked off with the gyro *and* the helicopter. I won the usual—nothing. Robbe/Schluter also had a nice display that showed a good cross section of their products. I'm really looking forward to the '92 event. I suspect that the turnout will be even larger and that all the top FAI fliers will be present. If you live anywhere near this event, attend; you won't be sorry. I believe this competition is destined to be equal to any in the country. Until next time, happy flying! ■



Robbe/Schluter had a nice display, but the boats and the sub wouldn't hover.

ROTARY-WING ROUNDUP

NEW HELI PRODUCTS

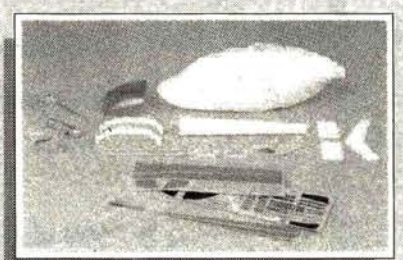
ALTECH/HIROBO'S
New Tow Cobra AH-1S

Hirobo's Tow Cobra AH-1S III is a .60- to .80ci-powered, scale machine that features a redesigned frame that's based on the competition mechanics of the Condor and Eagle machines. The body has Tow launchers, a gun sight, wipers, door handles, turbine exhaust and a pivoting forward gun. It uses Hirobo's SST mechanics for solid flight tracking. Its main-rotor diameter is 61.02 inches; its body length is 58.6 inches; and its overall weight is approximately 12.7 pounds.

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08818; (908) 248-8738.

KYOSHO/GREAT PLANES
Concept .60 Jet Ranger Body

Made of the same durable polypropylene plastic as Concept .30 bodies, the Concept .60 Jet Ranger body can be finished in one evening and installed the next evening. Simply cut out the windows, add the windshield and the flexible stickers, and install the body on the heli. The body comes with white landing gear. It's extremely durable, so it's ideal for competition or sport fliers. A special muffler is available. All you need is a starter extension and a one-way starter cone.



Part no. KYOE0325

Price: $379.99

For more information, contact Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820; (217) 398-3630.

HOBBY DYNAMICS
Heli-Battery

This 8-cell, 9.6V battery pack is rated at 1100mAh, yet it's only slightly larger than a standard, flat, 6-cell 7.2V pack. This battery can be used with the Kalt Whisper helicopter.

For more information, contact Hobby Dynamics Distributors, P.O. Box 3726, Champaign, IL 61826; (217) 355-0022.

Descriptions of new products appearing on this page were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute an endorsement by **Model Airplane News**, nor guarantee product performance or safety.

BASIC HELICOPTER AERODYNAMICS

by PAUL TRADELIUS

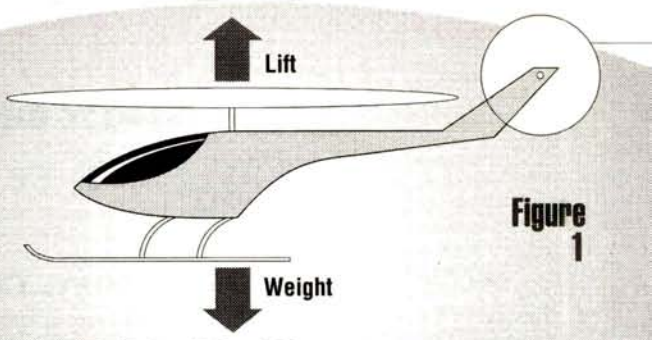


Figure 1

THE FIXED-WING aircraft guys have an old saying about helicopters that goes something like this: "Helicopters don't fly—they just beat the air into submission." When you think of the "whop-whop" sounds that helicopters make, it's easy to see where this saying came from. Contrary to this, however, helicopters *do* fly, or at least react to some very basic principles. These principles are easy to understand, and they explain some of the things that choppers do. Without getting into too much theory, let's examine a helicopter from different views and see what kind of information we can discover.

It's important to examine the helicopter from different angles because we can analyze certain characteristics from each one and see how the forces of the helicopter react to provide the flight characteristics we see in our machines. As they say, a picture is worth a thousand words.

• In **Figure 1,** we see the left side of a helicopter in hover. The two forces present in this view are the thrust of the rotor blades going up and the weight of the helicopter going down. The weight counters the force of the blades. (Notice that we aren't considering the other forces on the helicopter that can't be seen in this view; they'll be covered later.)

Every force we see in a particular view must be balanced by an opposing force, or the helicopter won't remain in a stationary hover. Any "extra" force will cause the helicopter to move in the direction of the force.

In Figure 1, the weight is exactly countered by the main-rotor thrust, which is represented by the two arrows of the same length. This may seem like a pretty basic idea when the helicopter is straight and level, but suppose we try to get the helicopter off the ground into a hover, and the ground isn't perfectly level. (What flying field *is* ?) In that case, the lift isn't going straight up to counter the weight. Instead, it's angled to one side or the other, depending on which way the ground/helicopter are leaning.

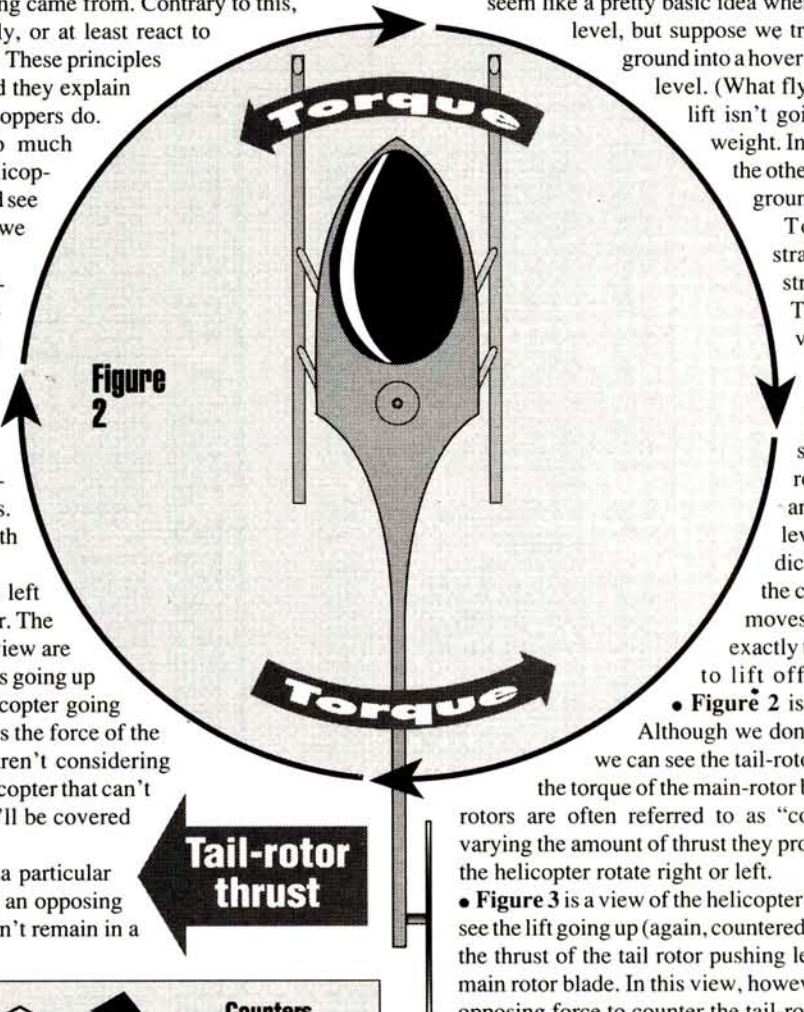


Figure 2

To get the helicopter to lift straight up, the lift must point straight up to counter the weight. This explains why helicopters very rarely lift straight up off the ground, even though they may be in trim from the last flight. To get the helicopter to lift straight up, you must look at the rotor disk as it comes up to speed and use the cyclic controls to level the disk so that it's perpendicular to the weight. Then, center the cyclic controls as the helicopter moves away from the ground. This is exactly the technique that's required to lift off from a hillside.

• **Figure 2** is a top view of the helicopter. Although we don't see the lift and weight here, we can see the tail-rotor thrust moving left to counter the torque of the main-rotor blade as it spins clockwise. Tail rotors are often referred to as "counter-torque rotors" and, by varying the amount of thrust they produce, we can make the nose of the helicopter rotate right or left.

• **Figure 3** is a view of the helicopter from its tail to its nose. We still see the lift going up (again, countered by the weight going down) and the thrust of the tail rotor pushing left to counter the torque of the main rotor blade. In this view, however, we can see that, without an opposing force to counter the tail-rotor force, the helicopter would "drift" to the left rather than remain in a stationary hover position. This is why helicopters must hover with a slight right bank; part of the lift must be tilted to the right to counter this tail-rotor force. (If you were hovering

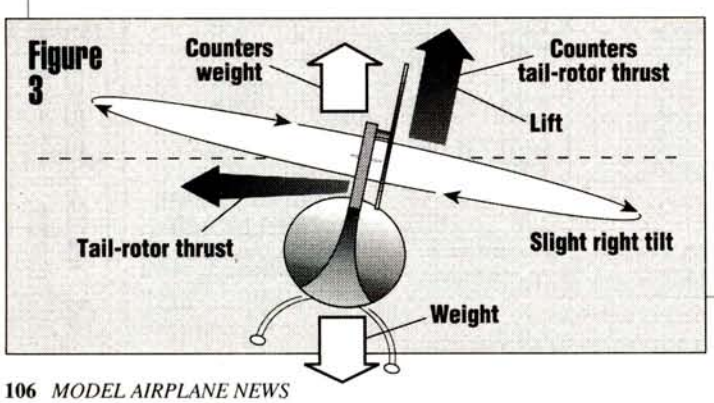


Figure 3

Force funda

a helicopter on which the main rotor was turning counterclockwise, then you'd have to set it up so that it would tilt to the left during hover.)

This tilting is particularly noticeable when you use training gear, and it can be a problem for novice helicopter pilots. Thinking that the helicopter should lift straight off the ground in a level attitude leaves the thrust of the tail rotor to move the helicopter to the side. Only after you've given a cyclic command to tilt the helicopter to oppose the tail-rotor thrust will the helicopter remain in a stationary hover, and this tilt will then be very noticeable. Therefore, to lift the helicopter straight up from the ground, you must raise the left side of the training gear an inch or so off the ground to produce this tilt.

All of these forces apply to full-scale helicopters, too, but some are harder to see than others. The tail-rotor thrust is opposed but, during hover, full-size helicopters remain level, i.e., they don't tilt right or left. The reason for this is that their main shafts are tilted slightly so that the thrust from their main rotors offsets that from their tail rotors, but the helicopters' bodies remain level for passenger comfort. In the same manner, their main shafts are also tilted slightly forward so that, during forward flight, the bodies remain level.

The idea of tilting the main shaft to the right isn't worth the extra design effort in our models, but the main shafts in Heim helicopters are tilted forward. This gives them a distinctive, nose-high appearance during hover, but it also really streamlines the fuselage for forward flight.

None of these concepts is particularly hard to understand, and each will give you a better understanding of why helicopters perform the way they do. ■

mentals

CAD-CAT

(Continued from page 97)

Hobby Horn, *15173 Moran Ave., Westminster, CA 92683.*
Futaba Corp. of America, *4 Studebaker, Irvine, CA 92718.*
Airtronics Inc., *11 Autry, Irvine, CA 92718.*
Brian Chan, *20 Lemon Ct., Hillsborough, CA 94010.*
APC, *sold by Landing Products, P.O. Box 938, Knights Landing, CA 95645.*
Midway Model Co., *P.O. Box 9, Midway City, CA 92655.*
Tru-Turn Precision Model Products, *P.O. Box 836, South Houston, TX 77587.* ■

QUIET FLIGHT

(Continued from page 53)

at 1 amp for its 6-cell flight pack. On a good day, it should be possible to keep the 71-inch-span model up for hours without landing. The solar cells will also be available for those who wish to design their own models.

● **Graupner Speed 700 BB Turbo Motor.** This ball-bearing, five-pole motor with internal cooling fan can be operated on eight to 10 cells. With a 9x5 or a 10x6 prop, it will produce approximately 3 pounds of thrust, enabling it to power models that weigh up to 4 pounds.

● **Graupner SB-13.** This 84-inch-span, scale, flying-wing model is based on the full-scale German Akaflieg Braunschweig sailplane. It has been subtly changed to improve its aerobatic ability, and it's suitable for slope soar-

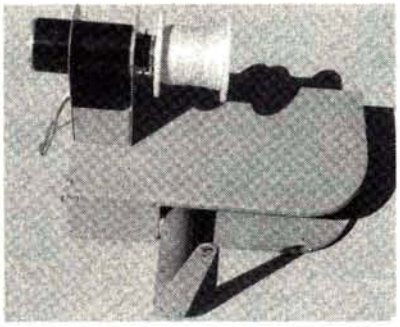
(Continued on page 119)

PRODUCT NEWS

PALMER PLANS
Herky-Bird

Palmer Plans announces its 1:30 plans for the Lockheed C-130 Herky-Bird. It has a wingspan of 51.5 inches; it's powered by four Cox .051 Tee Dee engines; and it weighs 4 pounds. Three-views and outlines were derived from Lockheed-Marietta documentation.

For more information, contact Dan Palmer, Palmer Plans, 210½ El Camino Dr., Beverly Hills, CA 90212; (213) 274-2456.



VMC FLIGHT
High-Start/Winch Retriever

VMC Flight has developed an efficient, fast, reliable retriever that's easy to operate and handles both high-start and winch-launch systems. This retriever is a lightweight, stand-up, foot-operated, hands-off, self-contained system. The line-untwisting device, the custom ball-bearing main motor and the guide's wiper action make the Model 20 a real asset to glider flying.

Price: $319

For more information, contact VMC Flight, 18971 Fernbrook Ct., Saratoga, CA 95070; (800) 225-0364.

BOB VIOLETT MODELS
T-33 Shooting Star

If you want a 15-pound scale jet that's larger than most (80-inch wingspan), easy to assemble, not too fast and a cinch to fly, then BVM has the jet for you. The T-33 Shooting Star has a straight wing, and it's readily visible in flight. The fuselage, hatch and ducting are molded of epoxy/glass and Kevlar. The wings and tails are of factory-built foam and carbon fiber, and the balsa skins have already been applied. All special hardware, USAF or Navy decals and a cockpit are included. The retracts and scale actuating struts are specially made by BVM to complement the T-Bird. A Viojett fan unit with a BVM .81 or new BVM .91 supplies the thrust.

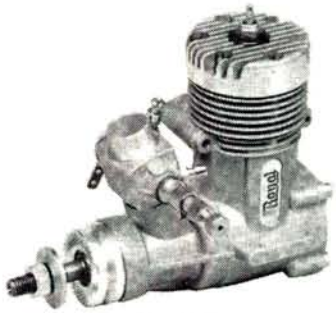
For more information, contact Bob Violett Models, 1373 Citrus Rd., Winter Springs, FL 32708; (407) 365-5869.

HOBBY HARDWARE
Trans:case

Hobby Hardware's TC-1 solidly built Trans:case transmitter case is made of durable, industrial-grade plastic that has a scratch-resistant surface and twin positive locking latches. Inside are four layers of high-density, impact-absorbing foam, which can be easily cut to conform to any transmitter. Also included is the special Mylar owner/transmitter identification label.

Price: $39.95

For more information, contact Hobby Hardware, 7903 South Grandview Ave., Tempe, AZ 85284; (602) 838-2085.

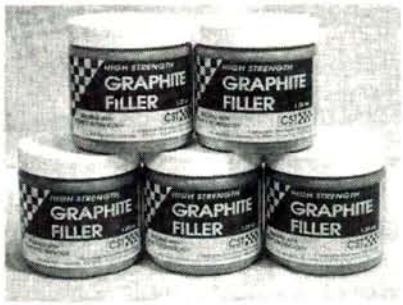


ROYAL
.46 ABC Schnuerle

This modified version of the Royal .45 will swing a prop with a longer pitch. It features twin ball bearings; full fuel-metered carburetion for positive mid-range throttle response; a directional adjusting muffler with a removable noise baffle; and a slightly longer stroke that provides more torque. It comes with a tool set.

Price: $124.95

For more information, contact Royal Products Corp., 790 West Tennessee Ave., Denver, CO 80223; (303) 778-7711.

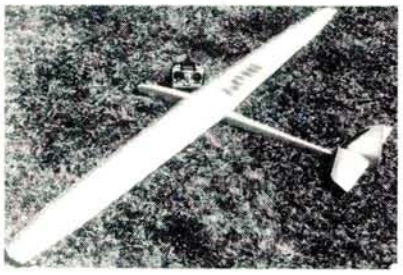


CST
Graphite Filler

Composite Structures Technology's lightweight Graphite Filler is perfect for reinforcing highly stressed joints and fillets. Its graphite filaments interlock and form a complex matrix to make this graphite/epoxy compound extremely strong. Mix it with your favorite epoxy to reinforce engine mounts and firewalls, or to make strong fillets. After it has cured, it's easy to sand.

For more information, contact CST, Dept. C91, P.O. Box 4615, Lancaster, CA 93539; (800) 338-1CST.

PRODUCT NEWS



NORTHEAST SAILPLANE
Alcyone Glider

Northeast Sailplane Products is pleased to announce Culpepper Models Alcyone—a 121-inch competition thermal plane that's based on the highly successful Chuperosa design that was a 1991 Nats champion. Alcyone uses a combination of the Selig 7032 and 7037 airfoils which, when coupled with the light (9.6 ounces per square foot) wing loading, results in superb performance. Polyhedral tiplets increase flight stability. The kit features an easy-to-build balsa/spruce/plywood fuse, foam-core wings, outstanding plans and instructions, and an extensive hardware package. Controls include ailerons, flaps, elevator and rudder. The airplane requires only three servos for surface control.

Price: $149.95

For more information, contact Northeast Sailplane Products, 16 Kirby Ln., Williston, VT 05495; (802) 658-9482.

MIDWEST PRODUCTS
Fuelproof Rubber Bands

Midwest Products puts these rubber bands through a revolutionary ultraviolet treatment that retards the deterioration that's caused by sunlight and protects them from smog and fuel. Available in all sizes.

Part nos. 1043 (no. 62 rubber bands); 1044 (no. 64 rubber bands).

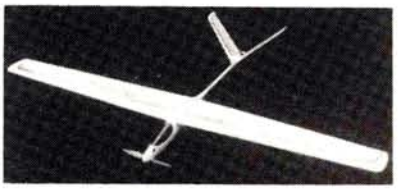
Price: $2.49/box

For more information, contact Midwest Products Co. Inc., 400 S. Indiana St., P.O. Box 564, Hobart, IN 46342; (219) 942-1134.

DAVIS DIESEL DEVELOPMENT
Soundmaster Mufflers

Davis now offers Pitts-style (inside the cowl) Soundmaster mufflers for engines as small as .25 all the way up to 2.2ci. (An SMQ40 Pitts-style version in an O.S. .45 engine is shown.) A light, seamless, alloyed steel body with a built-in pressure tap is part of this remarkable muffler's design. The universal mounting fits virtually all engines, and you can easily move it from one engine to another in minutes. Soundmaster mufflers have been recognized by the AMA Sound Committee as the most efficient mufflers available today.

For more information, contact Davis Diesel Development, P.O. Box 141, Milford, CT 06460; (203) 877-1670.

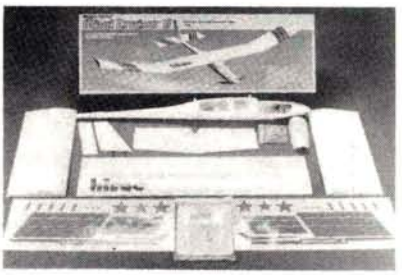


JAREL AIRCRAFT
Impulse 2m Sailplane

The Impulse sailplane may be the most innovative 2-meter design offered in years. Its CrashGuard thermoplastic fuselage, canopy and wing tips are so strong that they're guaranteed! It's designed for winch or high-start launches and thermal, slope, or electric flight. It features shaped-hardwood leading edges; machine-cut foam-cores; a complete hardware package; and instructions with more than 70 photographs.

Price: $79.95

For more information, contact Jarel Aircraft Design & Eng., 12136 Braddock Dr., Culver City, CA 90230; (213) 390-1348.



HITEC
Windcruiser II

With its 66.5-inch wingspan, this 22.6-inch ARF glider is easy to control. It's designed to be used with a 2- or 3-channel aircraft control system, and it includes a Mabuchi RS-540SH motor with a direct-drive, folding prop; servo trays (attached); pushrod/horn linkage; hardware; and decals. With the optional 7.2V Ni-Cd battery pack, receivers and servos, the Windcruiser II weighs 38.86 ounces.

For more information contact, Hitec R/C USA Inc., 9419 Abraham Way, Santee, CA 92071; (619) 449-1112.

CUSTOM ELECTRONICS
CEU Universal Radio Connector

The CEU is a four-pin, three-wire, female radio connector that can be mated with Airtronics, Futaba J, JR, Hitec, or the new World Engine servos and receiver battery packs. In addition to being universal, it's the only connector of this type to which you can solder wires.

Prices: $3 (assembled with an 8-inch wire attached); $2.50 (unassembled).

For more information, contact Custom Electronics, P.O. Box 1332, Alta Loma, CA 91701; (714) 980-4244.

AEROBATICS

(Continued from page 94)

As for aileron, three rolls with full aileron control should take about 6 seconds. This is a suggested starting point. If you want more (or less), do so, but make changes gradually.

I must address control-surface gap. Let's all make a vow right now: "I promise it will never exist on my plane again." The change that can occur when you seal all control surfaces is amazing. Even if you think that the gap is so small that it shouldn't make a difference, it does! I've even seen a loop-tracking problem solved by sealing the ailerons! Figure 3 should help you seal that gap.

Please write to me with any questions that you have on flying, setup, aerobatics pointers on maneuvers, etc., c/o *Model Airplane News*. Until next month!

ABOUT ENGINES

(Continued from page 73)

able with R/C throttle.

Ed Carlson* imports an incredible array of model diesel motors from all over the world—almost 150 types in his current catalogue ($1). He sells everything from modern replicas of "antique" diesels (e.g., the original Italian "Movo" and the much-loved British Mills .045 and .08) to the most modern high-performance diesels, such as the Czech Pfeffer engines, the Dutch USE line and the Russian MK-17.

Speaking of Russian-built model engines, for decades, several Iron Curtain countries have included model airplane building and flying in their regular school curricula. In fact, typical model engines—diesels, of course—were designed specifically for these school programs and manufactured in large quantities. That made them very inexpensive. Carlson imports a couple of these.

One of them represents the biggest bargain in model diesels today: the Chinese Silver

(Continued on page 138)

QUIET FLIGHT

(Continued from page 108)

ing, electric flight, or high-start launching.

Till next time, good thermals and a full charge!

**Here are the addresses of the companies that are mentioned in this article:*
***Hobby Shack/Global Hobby**, 10725 Ellis Ave., Fountain Valley, CA 92728.*
***Zap**; distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414.*
***Bob Martin R/C Models**, 1520C Acoma Ln., Lake Havasu City, AZ 86403.*
***Carl Goldberg Models**, 4734 W. Chicago Ave., Chicago, IL 60651.*
***Midway Model Co.**, P.O. Box 9, Midway City, CA 92655.*
***Culpepper Models**; distributed by Northeast Sailplane Products, 16 Kirby Ln., Williston, VT 05495.*
***Sonic-Tronics Inc.**, 7865 Mill Rd., Elkins Park, PA 19117.*
***Hobby Lobby Int'l.**, 5614 Franklin Pike Cir., Brentwood, TN 37027.*

BRANSTNER

(Continued from page 69)

correct trim was therefore paramount; having established it, you measured the surface deflections for reference.

The night before my last flight, Branstner asked if there was a problem, and I replied that I thought the plane was slightly out of trim. He insisted on helping me to check it out. Using a fine rule, we found that the surfaces were no more than 1/16 inch off, and we spent much time on contemplating them and setting them *exactly* right. (His desire was always for *perfection!)*

As we prepared for that last flight, he insisted that we'd have *the* flight of the meet, and his optimism really rubbed off on me. (I imagine that it must have affected his Bramco coworkers in the same way.) I happily recall that the flight came within a third of a point of winning the meet!

SOMETHING COMPLETELY DIFFERENT

Following the sale of Bramco, Branstner looked for other endeavors, and his interest in

(Continued on page 122)

NAME THAT PLANE

CAN YOU IDENTIFY THIS AIRCRAFT?

If so, send your answer to Model Airplane News, **Name That Plane Contest** (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.

Congratulations to Robert Wynne of Mercer Island, WA, for correctly identifying the December issue's mystery plane: the Blohm & Voss Hamburg HA-137 gull-wing fighter. Robert's answer was chosen from 39 correct entries.

The HA-137 was first produced in 1937 as a combination trainer/dive bomber, and it was skinned with the German equivalent of Alclad aluminum, "Duralplat." For training, the plane was fitted with the Junkers Jumo 205C inverted, V12, liquid-cooled, 600hp, geared engine. For combat, this was replaced with the 680hp Jumo 210C.

The single-cockpit dive-bomber was 31 feet long and had a wingspan of 36 feet, 7 inches. Turning a three-blade, variable-pitch V.D.M propeller, the plane had a top speed of 205mph and a cruising speed of 180mph (with the 205C engine). It was armed with twin Krupp-Spandau 50-caliber machine guns that fired through the propeller, and two 20mm cannons (one in each wing) that were mounted just above the landing gear. These were augmented with bomb racks that could handle either 10 10kg or four 50kg fragmentation bombs. The HA-137 had an empty weight of 3,993 pounds and a gross weight of 5,313 pounds. Although it wasn't manufactured in great numbers, the HA-137 was very successful.

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to **Model Airplane News.** If already a subscriber, the winner will receive a free one-year extension of his subscription.

CLUB OF THE MONTH

WESTMINSTER AEROMODELERS
c/o Jim Garrett, 1523 Hughes Shop Rd.,
Westminster, Maryland, 21158

One of the most important things an R/C model club can do is initiate and maintain good public relations. To do this, a club can establish school programs, obtain television coverage of local events and appoint a liaison officer to represent the club to the town government.

The Westminster Aero Modelers club (Milt Peacock, president) has done these things and more. The club's newsletter, *The Talespinner*, relates that the club's ongoing school program is very successful and that it has received praise from the teachers involved. Copies of two students' thank-you letters are printed for members to enjoy. (One child writes, "Some of you look like my grandfather."!)

In September 1991, club member Ray Miles had the opportunity to promote the club on local television. A 12-minute spot on TV can do wonders! Ray is also the WAM County Liason.

Other newsletter niceties include "AMA News," "Aviation Trivia," "Aviation History," "Radio Frequency Alerts," "Club Events" and even aviation book reviews. *The Talespinner* is a well-rounded, interesting newsletter that reflects and reviews the activities of an active and growing club.

For their continuing efforts to build strong public relations and for their involvement at the local school level, we award two one-year subscriptions to our newest "Club of the Month." Enjoy!

BRANSTNER

(Continued from page 119)

racing and speed led him to establish Dick Branstner Enterprises, with a special interest in auto drag racing. To appreciate his accomplishments in this, you need to know about the state of drag racing in the early '60s. It had just reached "big time" and, generally speaking, the regulations called for a "stock" car, i.e., one with all the components it had when it left the assembly line (nothing like today's "stock" car, which has a special chassis covered by a fiberglass shell that simulates a stock car).

Sponsored by the Chrysler Corp., Branstner chose the Dodge Charger. With a line from a popular tune as its name, the car—"Color Me Gone"—was driven by Roger Lindamood.

Fliers know that when all else has been fixed, there are only two, complementary ways to increase speed: increase power and/or decrease weight. With his aviation background, Dick did both. Everyone was boosting power, but no one had gone to any lengths to reduce weight, which Branstner thought was the key to success. Probably with the cooperation of Chrysler and its facilities, steel was replaced with aluminum. Using it to make such things as bumpers, seats, grills, trim moldings, etc., considerably reduced weight, but still met the intent of the sport's rules.

Like everything else Branstner was involved in, the Color Me Gone car quickly established its superiority in drag racing meets and eventually took a national championship, which Branstner greatly relished. Having proven his point, what else was there to do?

After the drag-racing episode, he was briefly involved with the Lionel and American Flyer train corporations, and he finished his years as product engineer for the Tyco Corp. in California.

The world needs more Dick Branstners—people with "we can do it" natures and optimistic attitudes; people who find a way to get the job done. Dick will live on in our memories, and we're thankful for his many contributions to R/C!

CLASSIFIED

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GIANT-SCALE PLANS—send SAE to Dry Ridge Models, 59 McCurry Rd., Weaverville, NC 28787.

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ABOUT ENGINES

(Continued from page 117)

Swallow .15. For $35 (postpaid), Ed will send you one, complete with a wrench, an alternate venturi, mounting hardware and excellent instructions. With a little practice, I found that I could readily hand-start my Silver Swallow, even in its "racing" configuration. It's an ideal engine with which to learn "diesel technique."

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**Here are the addresses that are relevant to this article:*
***Eric Clutton**, 913 Cedar Ln., Tullahoma, TN 37388.*
***Ed Carlson**, Carlson Engine Imports, 814 E. Marconi Ave., Phoenix, AZ 85022.*
***FHS**, 239 Bethel Church Rd., Clover, SC 29710.* ■

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